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UNITED STATES AIR FORCE AFIOH

AGE Bio Diesel Emissions Evaluation

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December 2003

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ACRONYMS

AFB Air Force Base

AFIERA Air Force Institute for Environment, Safety, and Occupational Health Risk Analysis

AGE Aerospace Ground Equipment CCT Clean Cam Technologies

CDRL Contract Data Requirements List CEM continuous emissions monitoring

CFM cubic feet per minute
CO Carbon Monoxide
CO₂ Carbon Dioxide

DOT Department of Transportation
DSCFM dry standard cubic feet per minute

EQ Environmental Quality Management, Inc.

FID flame ionization detector HAP Hazardous Air Pollutant

IATA International Aviation Transportation Association

ICAO International Civil Aviation Organization

IXRF Iridium X-ray Fluorescence
MCE carbon mass rate – exhaust
MCF carbon mass rate – fuel
MCI carbon mass rate – inlet air

NIOSH National Institute of Occupational Safety and Health

NO_X Nitrogen Oxides

NMHC Non Methane Hydrocarbons

PAH Polynuclear Aromatic Hydrocarbons PIC product of incomplete combustion

PM Particulate Matter PPM part per million

PPMVD part per million by volume dry

RSEQ Risk Analysis Environmental Quality

SAP Sampling and Analysis Plan SEM scanning electron microscopy

SPO System Program Office
THC total hydrocarbon
TO Technical Orders

TPM Technical Program Manager VOC volatile organic compound

TEST METHOD REFERENCES

Air Force Institute for Environment, Safety and Occupational Risk Analysis (AFIERA), Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations, January 2002.

American Society of Testing Materials (ASTM), http://www.astm.org/cgi-bin/SoftCart.exe/STORE/standardsearch.shtml?E+mystore

NIOSH Manual of Analytical Methods (NMAM), http://www.cdc.gov/niosh/nmam/nmammenu.html

United States Environmental Protection Agency (USEPA), Title 40, Code of Federal Regulations, Part 60, Appendix A http://www.epa.gov/ttn/emc/tmethods.html

USEPA SW846 http://www.epa.gov/epaoswer/hazwaste/test/methdev.htm

EXECUTIVE SUMMARY

An Emission Summary Scientific and Technical Report (Report) was previously prepared by Environmental Quality Management, Inc. (EQ) under Delivery Order Number T0702BG0204 of the General Services Administration (GSA) Federal Technology Service, IT Solutions, Greater Southeast Region (Contract Number GS-10F-0293K), Task FA5710043T6, and submitted May 2003. The report summarizes emissions from four AGE that underwent modification by Clean Cam Technologies.

The current contract and work order continues the scope of work previously completed. As part of this effort, this Addendum to that Report has been prepared by EQ under Delivery Order Number T0702BG1605 of the General Services Administration (GSA) Federal Technology Service, IT Solutions, Greater Southeast Region (Contract Number GS-10F-0293K), ACT A19556820. This addendum summarizes emissions from two diesel-powered AGE while burning bio diesel fuel.

Program Objectives

The purpose of this effort was to continue the scope of work previously completed and continue emissions testing of various AGE. As such, an –86 generator and Kubota NF2 light unit were tested at Scott AFB while operating on biodiesel fuel.

Biodiesel is an alternative fuel consisting of a mixture of diesel fuel and soybean oil. Biodiesel can be used in all diesel engines with little or no modification.

AGE Description

The -86 generator, rated at 148 brake horsepower (at 2000 RPM), is powered by the 4L-71N internal-combustion engine manufactured by Detroit Diesel Corporation. The Model A/M32A-86 is a naturally aspirated, two-stroke cycle, four-cylinder engine that utilizes a muffler and a 3-inch circular exhaust pipe exiting the bottom of the unit in a horizontal direction. The generator can be fueled on diesel, JP-8, or biodiesel fuel. The NF2 light unit operates a portable lighting system. The exhaust from the NF2 light unit travels through a muffler and a 2-inch round exhaust that exits at the bottom of the unit. Both AGE were fueled on biodiesel during the

program. The Kubota engine timing was set at 16.5 to 18.5 degrees before top dead center during testing.

Sampling Scenario

EQ traveled to Scott AFB to perform emission testing on several pieces of AGE. During the emissions test program, AF personnel operated the –86 generator and load bank to create specified loads. The –86 AGE was operated at 10%, 25%, 50%, 75% and 100% loads. The NF2 lighting unit was operated at one load, its maximum continuous sustainable while operating the lights. The average -86 load was recorded at 15-minute intervals during each test run.

The generator exhausts were measured for PM, including particle size distribution, nitrogen oxides (NO_x), carbon monoxide (CO), total non-methane hydrocarbons (TNMHC) and select hazardous air pollutants (HAPs). In conjunction with these tests, the exhaust flow rate, temperature, gas composition [carbon dioxide (CO₂) and oxygen (O₂)], and moisture were measured. Three one-hour tests for these parameters were completed at each of the specified loads, with the exception of HAPs. One composite test, consisting of 10-minute tests at each setting (50 minutes total duration), was completed for HAP analysis for the –86 unit; one composite test of one-hour was completed for the NF2 lighting unit. Sampling for HAPs consisted of sampling for volatile organic compounds (VOCs), aldehydes/ketones, and polynuclear aromatic hydrocarbons (PAH).

Emission Results

A summary of the criteria pollutant weighted-emissions are provided in Table ES-1. The –86 AGE did not meet the EPA Tier 1 standard for NO_x or the Tier 2 standard for NO_x plus NMHC. Neither generator met the EPA Tier 2 standard for PM. The pollutant weighting criteria are summarized in Table ES-2.

The weighted hazardous air pollutant emission indexes are summarized in Table ES-3.

TABLE ES-1. EMISSION SUMMARY WEIGHTED RESULTS SCOTT AFB

Unit No.	N	$\mathbf{O}_{\mathbf{X}}$	C	o	NM	НС	P	М	$NO_X + NMHC$
`	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	g/hp-hrª
-86 (DG09) b	0.87	44.99	0.02	0.85	0.01	0.49	0.02	0.85	45.48
NF2 (FL08) c	0.20	2.92	0.09	1.23	0.01	0.14	0.02	0.27	3.06
EPA Tier 1		6.9							
EPA Tier 2				3.7				0.22	4.9

^aEPA will use an NMHC +NOx standard of 4.9 g/hp-hr for Tier 2 nonroad diesel engines.

TABLE ES-2. WEIGHTING CRITERIA

Percent Load	Weighting Factor
100	0.05
75	0.25
50	0.30
25	0.30
10	0.10

Note: Weighting criteria specified in ISO 8178-4 "D2."

TABLE ES-3. AGE TESTING SCOTT AFB HAZARDOUS AIR POLLUTANTS (HAPs) EMISSION FACTOR SUMMARY

lbs/1000 lbs fuel

	-86 (DG09)	NF2 (FL08)
Exhaust Flow, dscfm	344	30
Average Fuel Flow, lbs/hr	5.04	2.00
Pollutant		
Formaldehyde	2.06E-02	2.59E-02
Acetaldehyde	1.93E-02	8.18E-02
Acrolein	ND	3.82E-02
Isobutraldehyde, 2-Butanone (MEK)	4.83E-03	2.95E-02
Benzene	3.87E-02	2.18E-01
Bromomethane	3.30E-03	7.04E-04
Toluene	1.88E-02	8.96E-02
Ethylbenzene	1.12E-02	3.33E-02
Methylene chloride	1.03E-02	3.52E-02
m,p-Xylene	2.13E-02	7.68E-02
o-Xylene	8.90E-03	3.65E-02
Propanal	ND	1.64E-02
Total HAPs	0.16	0.68

ND = Not Detected

^bThe -86 utilizes a Detroit diesel engine.

^cThe NF2 light unit utilizes a Kubota diesel engine. Results shown for FL08 are not weighted, but are as emitted during a single continuous maximum load while operating the lights.

SECTION 1

INTRODUCTION

An Emission Summary Scientific and Technical Report (Report) was previously prepared by Environmental Quality Management, Inc. (EQ) under Delivery Order Number T0702BG0204 of the General Services Administration (GSA) Federal Technology Service, IT Solutions, Greater Southeast Region (Contract Number GS-10F-0293K), Task FA5710043T6, and submitted May 2003.

The current contract and work order continues the scope of work previously completed. As part of this effort, this Addendum to that Report has been prepared by EQ under Delivery Order Number T0702BG1605 of the General Services Administration (GSA) Federal Technology Service, IT Solutions, Greater Southeast Region (Contract Number GS-10F-0293K), ACT A19556820.

The project requirements were described in the contract and its attached Statement of Work.

The project included:

- Preparation of a SAP (Electronically submitted August 2003)
- Preparation of monthly progress, status, and management reports
- Preparation of conference agenda and minutes
- Preparation of a summary Scientific and Technical Report (this document).

A description of the project background and objectives is provided in this section.

1.1 Background

The A/M32A-86D (-86) generator is one of the most widely used pieces of aerospace ground support equipment (AGE) in the U.S. Air Force (AF). In June 1998, one -86 generator was retrofitted with the Clean Cam Technology (CCT) and tested at Southwest Research Institute in San Antonio, Texas. Emission test results showed that the CCT reduced nitrogen oxide (NO_x) emissions by 76%, carbon monoxide (CO) and total hydrocarbon (THC) emissions each by 43%, and particulate matter (PM) emissions by 32% compared to non-retrofitted -86

AGE. The emissions from the CCT unit met the Environmental Protection Agency (EPA) Non-Road Engine Emission Standards.

EQ completed an effort in 2002 to determine the long-term performance of the CCT retrofitted -86 generator. Prior to approving the CCT modification for general AF use, the AF needed to demonstrate that retrofitting did not negatively affect the operational performance of the unit, and that the CCT reduced emissions to an acceptable level.

In order to complete these objectives, four –86 generator engines (Detroit Diesel 4L-71N) were obtained through Warner Robins AFB in Georgia and retrofitted with the CCT at the Clean Cam Technology Systems facility in Bakersfield, CA. Two of the retrofitted engines were then installed in two –86 AGE at Elmendorf AFB, and two of the retrofitted engines were installed in two –86 AGE at Travis AFB, California. Emissions were measured during summer visits to each facility. The operational performance was evaluated by AGE Personnel at each location on four retrofitted units and compared to four non-retrofitted units.

Specifically, the testing program assessed emissions of PM, including particulate sizing, NO_x , CO, total non-methane hydrocarbons (TNMHC) and hazardous air pollutants (HAPs) through volatile organic compounds (VOC) and Aldehyde and Ketone sampling. In conjunction with these tests, stack gas flow rate, temperature, composition [carbon dioxide (CO₂) and oxygen (O₂)], and moisture were measured.

These parameters were measured at five specified loads: 10%, 25%, 50%, 75%, and 100%. A load bank (an artificial load comprised of heating coils) provided the resistance necessary for AGE operation at the specified loads.

The AGE were operated on diesel and JP-8 fuel. Fuels used during the testing were sampled and analyzed for: percent sulfur, carbon, nitrogen, hydrogen, ash, aromatics, paraffins, olefins, naphthenes, and Btu per pound.

Details of this sampling effort and results are included in the Clean Cam Technology –86 Demonstration Scientific and Technical Emission Summary Test Report submitted 5 May 2003. At the conclusion of the Clean CAM Technology program, it was determined to measure emissions from one AGE and one light unit while burning bio diesel fuel.

1.2 Objective

The purpose of this effort was to continue the scope of work previously completed and continue emissions testing of various AGE. As such, an -86 generator and Kubota NF2 light unit were tested at Scott AFB while operating on biodiesel fuel.

Biodiesel is an alternative fuel consisting of a mixture of diesel fuel and soybean oil. Biodiesel can be used in all diesel engines with little or no modification.

The testing effort assessed emissions of PM, including particulate sizing, NO_x , CO, total non-methane hydrocarbons (TNMHC) and hazardous air pollutants (HAPs) through volatile organic compounds (VOC), PAH and Aldehyde and Ketone sampling while the AGE operated on biodiesel. In conjunction with these tests, the exhaust flow rate, temperature, composition [carbon dioxide (CO₂) and oxygen (O₂)], and moisture were measured.

These parameters were measured at five specified loads: 10%, 25%, 50%, 75%, and 100%. A load bank (an artificial load comprised of heating coils) provided the resistance necessary for AGE operation at the specified loads. The NF2 light unit was operated at a single load, the maximum continuous load for this unit.

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SECTION 2

AGE DESCRIPTION AND EMISSIONS SAMPLING LOCATIONS

2.1 AGE Description

The –86 generator, rated at 148 brake horsepower (at 2000 RPM), is powered by the 4L-71N internal-combustion engine manufactured by Detroit Diesel Corporation. The Model A/M32A-86 is a naturally aspirated, two-stroke cycle, four-cylinder engine that utilizes a muffler and a 3-inch circular exhaust pipe exiting the bottom of the unit in a horizontal direction. The generator can be fueled on diesel, JP-8, or biodiesel fuel. The –86 diesel engine timing was set by the specifications noted in the technical order. The NF2 light unit operates a portable lighting system powered by a Kubota engine. The exhaust from the NF2 light unit travels through a muffler and a 2-inch round exhaust that exits at the bottom of the unit. Both units were fueled on biodiesel during the program. The Kubota engine timing was set at 16.5 to 18.5 degrees before top dead center during testing.

2.2 Sampling Locations

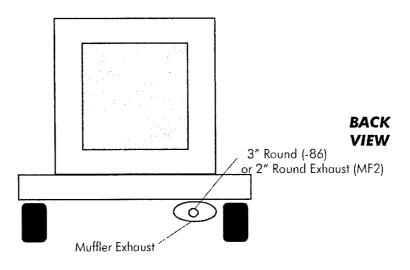
The -86 generator has an exhaust system that consists of a muffler and a 3-inch circular exhaust pipe that exits horizontally at the bottom of the unit; the NF2 light unit exhaust travels through a muffler and a 2-inch round exhaust. A temporary exhaust duct was connected to each exhaust to facilitate emission measurement. The extension consisted of a 90-degree elbow from the exhaust into a vertical straight run, directing the flow from a horizontal direction to a vertical. The vertical extension provided one sampling location that was for isokinetic sampling. This location was located at least 8 duct diameters (dd) downstream of the elbow. A second port was added to the vertical extension at a location at least one foot above the isokinetic port to provide access for a single-point sampling probe.

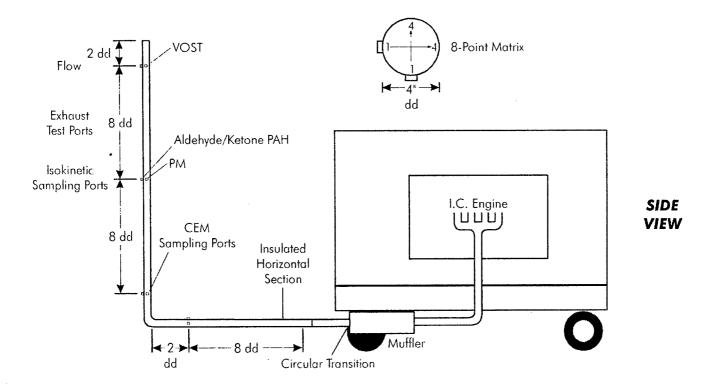
Due to the need for additional sampling parameters, a second straight run was added to the existing extension that ran horizontally from the -86 exhaust to the elbow. The horizontal insulated run consisted of an oval to circular transition and was of sufficient length to meet EPA Method 1A guidelines (at least 108" for sampling port locations in ducts less than 12 inches in

diameter) so that additional sampling ports could be added. A second location for isokinetic sampling was added within the horizontal straight run, at least two dd upstream of the elbow, and at least eight dd downstream of the exhaust. The addition of the second isokinetic sampling location allowed simultaneous testing for PM and HAPs, thereby reducing field time.

Finally, EPA Method 1A was used to locate the velocity measurement points in the exhaust stack. Specifically, eight points, four on each of two perpendicular diameters, were used for velocity measurements. The velocity ports were ½" i.d. ports located a minimum of 2 dd upstream of the extension's terminus, and 8 dd downstream of the single-point and isokinetic sampling ports.

See Figures 2-1 and 2-2 for sample point schematics.





dd - duct diameter

Figure 2-1. Schematic of -86 and NF2 Light Unit Stack Extension Modification

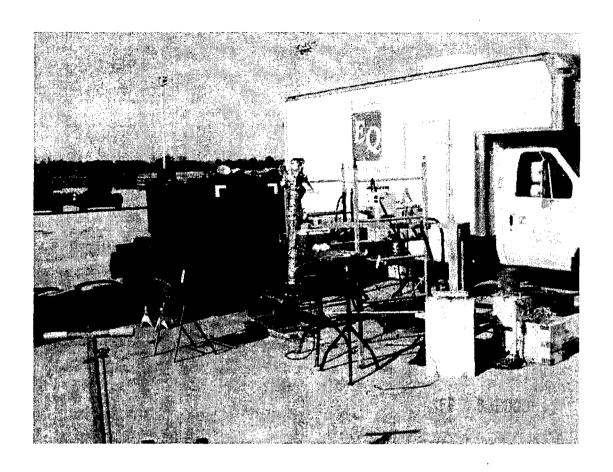


Figure 2-2. Photograph of Test Configuration at Scott AFB

SECTION 3

SAMPLING APPROACH

3.1 Engine Logistics

Scott AFB personnel identified one -86 AGE and one NF2 light unit for use in this program. Table 3-1 outlines the sampling program and responsibilities.

3.2 Sampling Scenario

EQ traveled to Scott AFB to perform emission testing on the two AGE. During the emission test program, AF personnel operated the -86 generator and load bank to create specified loads. The -86 AGE was operated at 10%, 25%, 50%, 75% and 100% loading. The NF2 light unit was operated at one load, the maximum continuous sustainable for this unit. The average load was recorded at 15-minute intervals during each test run.

The AGE were measured for PM including particle size distribution, NO_x, CO, TNMHC, O₂, CO₂ and HAPs (VOC, aldehydes and ketones, and PAH). Three one-hour tests for these parameters were completed at each of the specified loads, with the exception of HAPs. One composite test, consisting of 10-minute tests at each setting (50 minutes total duration), was completed for HAPs analysis for the –86 unit; one composite test of one-hour was completed for the NF2 lighting unit. Sampling for HAPs consisted of VOCs, aldehydes/ketones, and polynuclear aromatic hydrocarbons (PAH).

See Table 3-2 for Sampling Outline.

3.3 Sampling Schedule

Sampling was completed, as follows:

- Day one, September 8, 2003: Travel, Equipment Set-up; First AGE tested at 10%;
- Day two, September 9, 2003: First AGE tested at 25%, 50% and 75% load settings,

TABLE 3-1. SAMPLING PROGRAM BREAKDOWN OF RESPONSIBILITIES

Phase	Respo	nsibility
Phase	EQ	Air Force Personnel
Engine Logistics Emissions Testing	 EQ to contact Scott AFB EQ to travel to Scott AFB for site survey and kick-off meeting Sampling equipment calibration and operation (includes manual methods and CEM methods) prior to and during testing Sample shipment and analysis of exhaust and fuel samples Supply external fuel tank Maintain Quality 	 Provide –86 and Kubota NF2 light unit for testing. Participate in site survey and kick-off meeting AGE operation prior to and during testing Fueling of AGE prior to and during testing Provide Bio-diesel fuel to operate AGE during emissions testing Operation of generator load bank to create and maintain
	Assurance/Quality Control procedures	 10%, 25%, 50%, 75% and 100% loads during testing Record data on AGE operation during emissions testing Provide assistance with fittings and means of connecting fuel tank to AGE.
Schedule	Schedule testing	Approve schedule
Reporting	 Participate in kick-off meeting Complete monthly progress reports Participate in quarterly conference calls, as required Provide meeting minutes Collect, assemble, and analyze data and prepare final test results in electronic PDF format 	 Participate in kick-off meeting Participate in quarterly conference calls, as required

TABLE 3-2. TARGET EXHAUST POLLUTANTS FOR EACH ENGINE SETTING

Load	Sampling Duration	Particulate	HAPs ^a	NOx	TNMHC	00	CO ₂	02
Setting		Matter	(VOC, ALD/KEY, PAH)				·	
-86 AGE								
%01	3 hours (Three 1-hour test runs)	X	X	X	×	×	X	X
25%	3 hours (Three 1-hour test runs)	×	X	X	X	X	X	X
20%	3 hours (Three 1-hour test runs)	×	X	X	X	X	X	X
75%	3 hours (Three 1-hour test runs)	×	X	×	X	X	X	X
100%	3 hours (Three 1-hour test runs)	X	X	X	X	X	×	X
Light Unit NF2	.2							
Constant	3 hours (Three 1-hour test runs)	X	×	X	×	×	×	×
Maximum								
Load		· -						

- Day three, September 10, 2003: First AGE tested at 100% load setting; Second unit tested at maximum continuous load setting
- Day four, September 11, 2003: Tear down and depart site

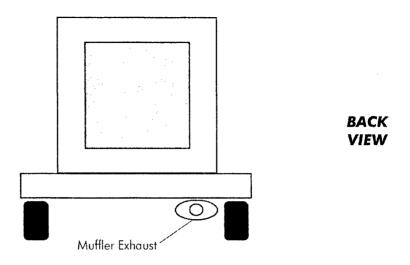
Testing personnel arrived onsite at least one hour prior to emissions test start-up time. Continuous emissions monitors (CEMs) were calibrated, and manual testing equipment was field checked. The AGE was fueled and started by AF personnel one-half hour before testing commenced. Following the final emissions test each day, EQ personnel recovered the samples, calibrated CEMs, and prepared for the following day's testing.

3.4 Fuel Consumption

Accurate measurement of fuel use was imperative so that emission rates could be correlated with fuel consumption rates. Emission rates could then be expressed in pounds of pollutant per thousand gallons of fuel consumed. Access to the fuel tank was difficult for the –86 generator and NF2 light unit. Therefore, an auxiliary fuel tank was connected directly to the test unit's primary fuel filter (see Figure 3-1). A tee fitting (or equivalent) was installed at the input side of the filter. This placement facilitated use of the fuel shut-off valve to isolate the test unit tank. The fuel line was then attached directly into the auxiliary fuel tank. The fuel tank was placed on top of a platform balance with a sensitivity of 0.1 lb; weights were recorded at the beginning and end of each test run. When the fuel was added during the test, it was supplied from pre-weighed jerry cans, with the weight of the can being recorded after the addition. In this way, the overall fuel consumption could be accurately calculated. The temperature of the fuel was monitored during testing.

In order to minimize fuel measurement errors, the fuel feed and return lines were suspended above the external tank. This eliminated errors in weight measurement caused by the fuel line mass.

Figure 3-2 presents a photograph of an external fuel task. Figure 3-3 presents a fuel supply photograph.



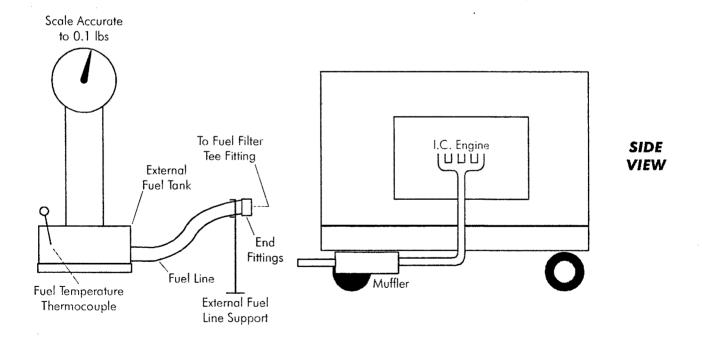


Figure 3-1. Schematic of External Fuel Tank

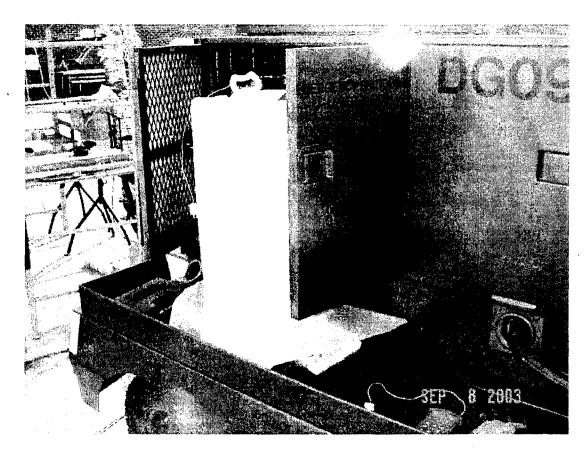


Figure 3-2. External Fuel Tank Photograph (Scott AFB)



Figure 3-3. Fuel Supply Photograph (Scott AFB)

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SECTION 4

TEST METHODOLOGY

This sample program involved sample collection from the exhausts of two units, a -86 generator and an NF2 light unit. The focus of the program was quantify engine emissions. Emission sampling was completed at five load settings, for the -86 generator; sampling was completed at one load only for the light unit.

Sampling was completed for the following compounds at the exhausts:

- Oxygen and Carbon Monoxide (EPA Method 3A)
- Flow Rate and Moisture (EPA Methods 1-4)
- Filterable and Condensible Particulate (EPA Methods 5 and 202)
- Nitrogen Oxides (EPA Method 7E)
- Carbon Monoxide (EPA Method 10)
- HAPs: Characterized through VOCs (EPA Method 0030), Aldehydes and Ketones (EPA Method 0011), and polynuclear aromatic hydrocarbons (NIOSH Method 5506)
- Total Non-Methane Hydrocarbons (TNMHC) as Total Hydrocarbons (THC) and Methane (EPA Method 25A)

The AGE exhausts were not sampled for sulfur dioxide, metals, or semi-volatiles.

4.1 Exhaust Emission Test Methods

4.1.1 Stack Gas Volumetric Flow Rate

EPA Method 2A, "Determination of Stack Gas Velocity and Volumetric Flow Rates," was used to determine stack gas volumetric flow rates. Standard pitot tubes meeting the EPA specifications and an inclined manometer were used to measure velocity pressures. A calibrated Type "K" thermocouple was used to measure stack gas temperature. The stack gas velocity was calculated from the average square root of the stack gas velocity pressure, average stack gas temperature, stack gas molecular weight, and absolute static pressure. The volumetric flow rate

was the product of velocity and stack cross-sectional area. The velocity measurements were made in the horizontal exhaust extension upstream of the sampling trains to avoid any flow disturbances.

4.1.2 Carbon Dioxide and Oxygen

EPA Method 3A was used to measure the concentration of CO_2 and O_2 in the stack gas. A zirconium oxide-based analyzer was calibrated with zero and three calibration gases before each test day. The calibration gases had concentrations of approximately 40% and 80% of the full-scale response of the analyzer. At the end of each sampling period, the analyzer was challenged with a zero and an upscale calibration gas. The calibration gasses were EPA Protocol $(\pm 2\%)$ gases. The analyzer operated continuously through each of the test runs.

4.1.3 Stack Gas Moisture Content

EPA Reference Method 4, "Determination of Moisture Content in Stack Gases," was used to determine the moisture content of the exhaust. This method was conducted as part of each particulate measurement run. The initial and final contents of all impingers was determined gravimetrically.

4.1.4 Particulate Sampling

EPA Method 5, "Determination of Particulate Emissions from Stationary Sources," was used to determine filterable particulate matter, and EPA Method 202 was used to determine condensable (back-half), organic, and inorganic particulate matter. The sampling train consisted of a heated glass-lined probe, heated glass-fiber filter, and a series of impingers followed by a vacuum pump, dry gas meter, and calibrated orifice. The filter temperature was maintained between 223° and 273°F. Thermocouples were used to monitor temperatures of the stack gas, sample probe, filter, and impinger exit gas.

For each load setting, one particulate sample was analyzed by scanning electron microscopy (SEM) equipped with an iridium X-ray fluorescence (IXRF) digital image system to determine the particulate size distribution by count and the aerodynamic particle shape. The EPA Method 5 filter media was modified for SEM analysis. A polycarbonate filter media was used after discussion with the analytical laboratory. The filter media chosen was based on the intent of gaining the highest possible quantity of measurable particulate matter.

4.1.5 Nitrogen Oxides (NO_x)

EPA Reference Method 7E, "Determination of Nitrogen Oxide Emissions from Stationary Sources (Instrumental Analyzer Procedure)," was employed. EQ used a chemiluminescent NO_x analyzer, manufactured by Thermo Environmental Instruments, for nitrogen oxide emission monitoring. The NO_x analyzer was operated continuously during each sampling test run. A zero and three calibration gases for the NO_x analyzer were used prior to the initial test run and at the end of each one-hour sampling period. The calibration gases were EPA Protocol calibration gases.

A stainless steel probe with a three-way valve on the exit end was inserted directly into the stack with a heated Teflon sample line attached to one side of the valve, and the calibration gas line attached to the other side. A conditioning system was attached to the exit end of the heated line for moisture removal. An unheated Teflon line connected the conditioning system and the analyzer. The same heated system was used to manifold stack and calibration gas to the NO_x and CO analyzers.

4.1.6 Carbon Monoxide (CO)

The CO concentration was measured by EPA Method 10. The CO sampling system used the same sampling system as described for the NO_x sampling system, plus a sample pump and a TECO Model 48 CO analyzer. The analyzer was calibrated with EPA Protocol calibration standards, and results were charted on a strip chart recorder.

4.1.7 Aldehydes and Ketones

The sampling train utilized to perform aldehyde and ketone sampling conformed to EPA Method 0011. A single composite sample run was collected over multiple engine loads.

4.1.8 Volatile Organic Compounds (VOCs)

EPA Method 0030, "Determination of Volatile Principal Organic Hazardous Constituents," was used to measure volatiles from the AGE exhaust. A 20-liter exhaust gas sample was collected at a constant rate of 0.25 liter per minute. A volatile organic sampling train (VOST) was used consisting of a glass-lined probe, a series of resin traps, and a condensate container. A single sample was collected over multiple engine load settings. Table 4-1 notes the target compounds.

TABLE 4-1. SUMMARY OF SOURCE TARGET COMPOUNDS FOR VOLATILE ORGANIC COMPOUNDS (EPA Method 0030)

ORGANIC COMPOUNDS (EPA Method 0030)		
V	OST Compounds	
Acetone	1,2-Dichloropropane	
Benzene	1,3-Dichloropropane	
Bromobenzene	2,2-Dichloropropane	
Bromochloromethane	Cis-1,3-Dichloropropene	
Bromodichloromethane	Trans-1,3-Dichloropropene	
Bromoform	1,2-Dichloropropene	
Bromomethane	Ethylbenzene	
1,3-Butadiene	Hexachlorobutadiene	
2-Butanone	2-Hexanone	
n-Butylbenzene	Isopropylbenzene	
Sec-Butylbenzene	p-Isopropyltoluene	
Tert-butylbenzene	Methylene chloride	
Carbon disulfide	4-Methyl-2-pentanone	
Carbon tetrachloride	Naphthalene	
Chlorobenzene	n-Propylbenzene	
Chlorodibromomethane	Styrene	
Chloroethane	1,1,1,2-Tetrachloroethane	
Chloroform	1,1,2,2-Tetrachloroethane	
Chloromethane	Tetrachloroethene	
2-Chlorotoluene	Toluene	
4-Chlorotoluene	1,2,3-Trichlorobenzene	
1,2-Dibromo-3-chloro-propane	1,2,4-Trichlorobenzene	
1,2-Dibromoethane	1,1,1-Trichloroethane	
Dibromoethane	1,1,2-Trichloroethane	
1,2-Dichlorobenzene	Trichloroethene	
1,3-Dichlorobenzene	Trichlorofluoromethane	
1,4-Dichlorobenzene	1,2,3-Trichloropropane	
Dichlorodifluoromethane	1,2,4-Trimethylbenzene	
1,1-Dichloroethane	1,3,5-Trimethylbenzene	
1,2-Dichloroethane	Vinyl chloride	
Cis-1,2-Dichloroethane	m-Xylene & p-Xylene	
Trans-1,2-Dichloroethane	o-Xylene	
1,1-Dichloroethane		

4.1.9 Polynuclear Aromatic Hydrocarbons (PAH)

National Institute of Occupational Safety and Health (NIOSH) Method 5506 was used to collect a sample for the target pollutants shown in Table 4-2. A sample was drawn through an in-stack filter across an XAD-2 resin trap at approximately 0.25 liter per minute. A single sample was collected over multiple engine load settings.

4.1.10 Total Non-Methane Hydrocarbons (TNMHC)

EPA Method 25A, "Determination of Total Hydrocarbons using a Flame Ionization Analyzer," was used to measure the TNMHC emissions. Stack gases were withdrawn via a stainless steel in-stack probe and heated (250°F) Teflon sample line, and delivered to the flame ionization detector (FID) with a heated sample pump. The analyzer, via an internal pumping system, withdrew the gas from the stack. Once inside the analyzer, the gas stream was split; a portion of the system was directed to an FID identical to the inlet, and a portion was directed to a proprietary-design non-methane hydrocarbon cutter. The cutter oxidized all hydrocarbons except methane. The methane-containing gas stream was then sent to an FID that determined the methane concentration. The response from each detector was converted to an analog signal (voltage) and recorded using a data acquisition system.

The analyzer was calibrated prior to, and at the conclusion of, each test run by using EPA Protocol 1 Calibration Gases.

A methane response factor for the analyzer was obtained by introducing a methane calibration gas to the calibrated J.U.M. 109A analyzer. The calibration gas value for methane and its relationship to the response of the THC analyzer yields the methane response factor. The response factor was divided into the average methane concentration determined during sampling on the analyzer to allow the methane results to be calculated as methane. The methane content, as methane, was then subtracted from the THC measured to determine the total non-methane THC, as methane.

4.2 Fuel Analysis

One composite fuel sample was taken during emission testing. Fuel samples were collected from the fuel supply line and analyzed for the parameters listed in Table 4-3.

TABLE 4-2. TARGET POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) (NIOSH METHOD 5506)

Polynuclear Aro	matic Hydrocarbons
Naphthalene	Chrysene
Acenaphthylene	Benzo[b]fluoranthene
Acenaphthene	Benzo[k]fluoranthene
Fluorene	Benzo[a]pyrene
Anthacene	Benzo[e]pyrene
Phenanthrene	Benzo[ghi]perylene
Fluoroanthene	Indeno[1,2,3-cd]pyrene
Pyrene	Dibenz[a,h]anthracene
Benz[a]anthracene	

TABLE 4-3. FUEL ANALYSIS

Analyte	Analytical Method
Sulfur (%)	ASTM D 5453
Carbon (%)	ASTM D 5291
Nitrogen (%)	ASTM D 4629
Hydrogen (%)	ASTM 5291
Ash (%)	ASTM D 482
Aromatics	PONA Analysis
Paraffins	PONA Analysis
Olefins	PONA Analysis
Naphthenes	PONA Analysis
Btu/lb_	ASTM D 240

SECTION 5

RESULTS

The purpose of this effort was to continue the scope of work previously completed (i.e. continue emissions testing of various AGE). As such, an -86 generator and NF2 light unit were tested at Scott AFB while operating on biodiesel fuel.

Biodiesel is a non-toxic and biodegradable alternative fuel and diesel additive made from vegetable oil. Biodiesel contains no petroleum, but can be blended with petroleum diesel to create a biodiesel blend. Biodiesel can be used in all diesel engines with little or no modification. Biodiesel burns cleaner than petroleum diesel and releases less CO₂ and PAH.

The testing effort assessed emissions of PM10, including particulate sizing, NO_x , CO, TNMHC and HAPs, consisting of VOC, PAH and aldehyde/ketones while the AGE operated on biodiesel. In conjunction with these tests, stack gas flow rate, temperature, composition (CO_2 and O_2), and moisture were measured.

These parameters were measured at five specified loads: 10%, 25%, 50%, 75%, and 100%. A load bank (an artificial load comprised of heating coils) provided the resistance necessary for AGE operation at the specified loads. The NF2 light unit was operated at a single load, the maximum continuous load.

5.1 EPA Tier 2 Pollutants

Emissions were collected directly from the engine's tailpipe through an exhaust stack. The results of the sampling are provided in the following sections. Table 5-1 illustrates a summary of trends of average emission factors for each pollutant at each load setting, for both units while operating on biodiesel fuel. Additional detail including emission results from individual runs, horsepower, and fuel usage is provided for each load setting in Tables 5-2 through 5-4.

5.1.1 Horsepower Calculations

During the emission test program, specific engine parameters were monitored to note engine performance. Facility personnel were responsible for collecting and maintaining the operating

TABLE 5-1. AGE EMISSION FACTOR SUMMARY

						Load	Load Setting				
	J	1(10%	25	25%	30	20%	75	75%	10	100%
Pollutant	nt	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr
NOx											
	DC00	0.92	139.82	0.84	38.19	0.87	35.30	0.88	30.92	98.0	24.51
	FL08	NA	NA	NA	NA	NA	NA	NA	NA	0.20	2.92
0.0								-			
	DC00	0.016	2.35	0.021	0.94	0.013	0.53	0.018	0.63	0.012	0.33
	FL08	NA	NA	NA	NA	NA	NA	NA	NA	980.0	1.23
NMHC			-			-					
	DC00	0.012	1.75	0.011	0.51	0.008	0.34	0.006	0.21	0.006	0.18
	FL08	NA	NA	NA	NA	NA	NA	NA	NA	0.010	0.14
PM											
	DC00	0.014	2.13	0.014	0.65	0.022	0.89	0.018	0.65	0.011	0.31
	FL08	NA	NA	NA	NA	NA	NA	NA	NA	0.019	0.27
co,)	%	Ó	%	ó	%	ó	%	ó	%
	DG00	4.	4.17	4.	4.27	4.	4.87	.9	6.15	5.	5.53
	FL08	_	NA	Z	NA	Z	NA	~	NA	4.	4.17
O_2			%	Ó	%	o`	%	o`	%	ò	%
	DC00	16	16.13	15	15.57	14	14.67	12	12.83	13	13.53
	FL08	7	NA	Z	NA	Z	NA	~	NA	15	15.10

- DG09 is an A/M32-86 Generator; FL08 is an NF2 Light Unit.

- Units were operated with Biodiesel fuel during testing.

- Results presented are the average of three runs. - FL08 was tested while operating at its constant maximum rate only.

TABLE 5-2. A/M32–86 EMISSION FACTOR SUMMARY

10% LOAD - SCOTT AFB

		Fuel usage,	Fuel Calculated	Ž	O _X)	0	NN	ТНС	P	M	CO	0,
Run No.	Run No. Unit No.			lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr % %	lbs/gal	g/hp-hr	%	%
	DG00	A	10.87	0.98	143.63	0.02	2.41	0.02	0.98 143.63 0.02 2.41 0.02 2.20	0.02	0.02 2.21 4.20 16.20	4.20	16.20
2	DG09	3.62	10.87	0.92	0.92 138.91	0.02	2.34	0.01	0.01 1.55	0.01	0.01 1.77 4.20 16.10	4.20	16.10
3	DG09	3.82	10.87	98.0	0.86 136.93 0.01	0.01	2.31	0.01	0.01 1.49	0.02	0.02 2.41 4.10 16.10	4.10	16.10
Avg.	DG09 3.65	3.65	10.87	0.92	0.92 139.82 0.02	0.02	2.35	0.01	0.01	0.01	2.13 4.17 16.13	4.17	16.13

25% LOAD - SCOTT AFB

	Fuel usage,	Fuel calculated		NOx		00	NN	NMHC	Ь	PM	CO ₂ O ₂	0,
Unit No.		hp	lbs/gal	g/hp-hr	lbs/gal	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr %	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	%	%
60DG	4.32	43.48	0.82	37.16	0.01	0.82 37.16 0.01 0.60 0.01 0.42 0.01 0.66 4.30 15.90	0.01	0.42	0.01	99.0	4.30	15.90
DG06	4.37	43.48	0.87	43.48 0.87 39.57 0.01	0.01	0.63	0.01	0.39	0.01	0.01 0.59 4.40 15.60	4.40	15.60
DG09	4.39	43.48	0.11	0.11 37.86 0.03	0.03	1.58 0.02	0.02	0.71 0.02	0.02	0.69 4.10 15.20	4.10	15.20
DG09	4.36	43.48	09.0	0.60 38.19 0.02	0.02	0.94	0.01	0.94 0.01 0.51 0.01 0.65 4.27 15.57	0.01	0.65	4.27	15.57

TABLE 5-3. A/M32–86 EMISSION FACTOR SUMMARY

50% LOAD - SCOTT AFB

	Fuel usage,	Fuel Calculated		NO _X	C	co	NN	NMHC	Ь	PM	CO_2 O_2	0,
Unit No.	gal/hr	hp	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr %	lbs/gal	g/hp-hr	%	%
DG06	5.11	56.52	0.85	0.85 34.94	0.01	0.53	0.01	0.36	0.02	0.74 4.90 14.70	4.90	14.70
DG00	5.03	56.52	0.88	35.69	0.01	0.53	0.01	0.34	0.03	1.11 4.90 14.60	4.90	14.60
DG06	4.94	56.52	0.89	0.89 35.27	0.01	0.52	0.01	0.31	0.02	0.81 4.80 14.70	4.80	14.70
DG06	5.03	56.52	0.87	0.87 35.30 0.01	0.01	0.53	0.01	0.34	0.02	0.89 4.87 14.67	4.87	14.67

75% LOAD - SCOTT AFB

		Fuel Calcul	Calculated		Č		00	2	JHWN	<u> </u>	DM	ç	
Run No.	Run No. Unit No.	gal/hr	hp		g/hp-hr	Ibs/gal	g/hp-hr	lbs/gal	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr %	lbs/gal	g/hp-hr		5 %
_	DG00	6.34	82.61	0.91	0.91 31.56 0.02	0.02	29.0	0.01	0.26	0.02	0.69 6.20 12.80	6.20	12.80
2	DG09	6.43	82.61	0.88	0.88 31.17	0.02	0.63	0.01	0.19	0.02	0.78 6.20 12.80	6.20	12.80
3	DC00	6.37	82.61	98.0	0.86 30.04	0.02	09.0	0.01	0.19	0.01	0.47 6.05 12.90	6.05	12.90
Avg.	Avg. DG09 6.38	6.38	82.61	0.88	0.88 30.92	0.02	0.63	0.01	0.21	0.02	0.65 6.15 12.83	6.15	12.83

TABLE 5-4. A/M32–86 EMISSION FACTOR SUMMARY

100% LOAD - SCOTT AFB

		Fuel usage,	Calculated	Ž	NOx) 	00	NMHC	HC	Ъ	PM	CO ₂	0,
Run No.	Run No. Unit No	-	hp	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr %	g/hp-hr	lbs/gal	g/hp-hr	%	%
	DC09	5.94	91.31	98.0	0.86 25.38 0.01	0.01	0.32	0.32 5.62E-03 0.17 0.01 0.26 5.40 13.70	0.17	0.01	0.26	5.40	13.70
2	DG00	5.54	91.31	0.88	0.88 24.37 0.01		0.34	0.34 6.65E-03 0.18 0.01	0.18	0.01	0.36 5.60 13.30	5.60	13.30
3	DG09	5.81	91.31	0.82	0.82 23.77	0.01	0.33	0.33 6.38E-03 0.18 0.01	0.18	0.01	0.30 5.60 13.60	5.60	13.60
Avg.	DG06	5.77	91.31	98.0	0.86 24.51 0.01	0.01	0.33	0.33 6.21E-03 0.18 0.01 0.31 5.53 13.53	0.18	0.01	0.31	5.53	13.53

NF2 LIGHT UNIT EMISSION SUMMARY 100% LOAD - SCOTT AFB

		Fuel usage,	Fuel Calculated	Ž	NOX		00	NMHC	HC	P	PM	CO ₂ O ₂	0,
Run No.	Run No. Unit No.		hp	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr lbs/gal g/hp-hr % %	g/hp-hr	lbs/gal	g/hp-hr	%	%
-	FL08	0.27	8.70	0.22	3.12 0.09	0.09	1.24	1.24 9.92E-03 0.14 0.02 0.28 4.10 14.90	0.14	0.02	0.28	4.10	14.90
2	FL08	0.27	8.70	0.19	2.73	60.0	1.24	1.24 1.03E-02 0.15 0.02	0.15	0.02	0.23 4.10 15.10	4.10	15.10
3	FL08	0.27	8.70	0.20	2.93	80.0	1.20	1.20 9.93E-03 0.14	0.14	0.02	0.02 0.29 4.30 15.30	4.30	15.30
Avg.	FL08	0.27	8.70	0.20	0.20 2.92	0.09	1.23	0.09 1.23 1.01E-02 0.14 0.02 0.27 4.17 15.10	0.14	0.02	0.27	4.17	15.10

data and for operating the engine in a safe manner. Select engine operation parameters (including load setting, horsepower, and fuel usage) are included in Tables 5-2 through 5-4.

Accurate measurement of fuel use was imperative so that emission rates could be correlated with fuel consumption rates, expressed in pounds of pollutant per thousand gallons of fuel consumed. In addition, horsepower could not be measured directly. Therefore, horsepower was calculated by multiplying the fuel usage an equation utilizing the AGE ampere and volts data converting to kilowatts and subsequently to horsepower. This calculation, provided by USAF personnel, allowed the emission rates to be correlated with horsepower, expressed as grams per horsepower hour (g/hp-hr). This data could then be compared directly with EPA's Tier 2 standards for non-road engines (as discussed in Section 5.1.5).

Calculated horsepower averaged 10.87 at 10%, 43.48 at 25%, 56.52 at 50%, 82.61 at 75%, and 91.31 at 100% load settings for the –86 generator; the NF2 light unit averaged 8.70 horsepower while operating at its maximum continuous load. Fuel usage averaged about 3.6 gal/hr, 4.3 gal/hr, 5.0 gal/hr, 6.4 gal /hr, and 5.8 gal/hr at 10%, 25%, 50%, 75%, and 100%, respectively for the –86 generator; the NF2 light unit fuel usage averaged 0.27 gal/hr.

5.1.2 Gaseous Emissions

Tables 5-1 through 5-4 present the gaseous emissions data collected at the five power settings (100%, 75%, 50%, 25%, and 10%) at which the –86 generator was operated during testing. In general, gaseous pollutant emission factors for NO_x, CO, and NMHC reported as lbs/gal remained consistent across the five power settings. However, NO_x emission factors in g/hp-hr decreased by 80% when operation was reduced from 10% to 25%. Emission factors for CO and NMHC decreased one-half to one-third as operation was increased from a load setting of 10% to 25%, and decreased again by a similar factor from 25% to 50%. Emission factors for NO_x and CO then remained fairly consistent from the 50% to 100% load settings while NMHC continued to decrease significantly as power increased. Percent CO₂ increased and percent O₂ decreased as the load setting increased from 10% to 100%.

The NF2 light unit was operated at a continuous maximum load; therefore trends are not available for comparison at various loads. When compared with the -86 generator, however, the NF2 light unit CO emission factor was almost five times greater than that of the -86, and the NO_X emission factor was almost 90% less than the -86. Emission factors for NMHC were similar.

5.1.3 Particulate

Testing for particulate emissions was completed on both the –86 and NF2 light unit. Particulate emission factors in lbs/gal almost doubled from the 25% load setting to the 50% load setting, and then decreased at 75% and again at 100% for the –86 generator. Particulate emission factors expressed in g/hr-hr behaved similarly. The NF2 light unit PM emission factor was similar to the –86. Tables 5-1 through 5-4 provide detailed results.

During the second PM test run, the filter media consisted of a polycarbonate material to allow for improved particle characterization by scanning electron microscopy. Each test run that used this material gained approximately twice the particulate mass as the other test runs. A review of the data determined that the mass gained, but not the particle distribution, was compromised by the filter material. However, these runs were included in the PM average as the emission rates were comparable with the first and third runs.

5.1.4 Particulate Characterization

During one run at each setting, a particle sample was collected on a polycarbonate filter for analysis via scanning electron microscopy to count the particles in each size range. The results of the particle counts are provided in Table 5-5. The analysis determined that the majority of particulate matter (>99%) was below 10 microns in size, with >80% of the particles at a diameter below 2.5 microns.

The distribution of the particles by mass was consistent. As the load increased from 25% to 50% the mass of particles less than 2.5 microns decreased from about 10% to 3%; as load increased from 50% to 100%, the mass of particles less than 2.5 microns increased again to about 8%. The analysis of the NF2 light unit at its maximum was comparable with the –86 analysis at 100% load.

5.1.5 Comparison to EPA Tier 2 Non-road Standards

Results from the five load settings were weighted based on the quantity of time spent at each load setting (ISO 8178-4 "D2") and compared to EPA Tier 2 Non-Road standards (Table 5-6). Although emissions of NO_X operating on biodiesel were expected to be lower, testing did not support this finding. Testing illustrated non-compliance with Tier 2 for the combined NO_X+NMHC standard of 4.9 g/hp-hr for the –86 generator. Both units were well within the CO standard of 3.7 g/hp-hr. However, neither of the units were able to meet the PM standard of 0.22 g/hp-hr, although the NF2 light unit was much closer than the –86 generator.

TABLE 5-5. PERCENTAGES OF NON-CARBON PARTICLES IN VARIOUS DIAMETER RANGES BY NUMBER OF PARTICLES

Diameter Range Engine Load (µm)	10%	25%	50%	75%	100%	100% (Light Unit FL08)
.5-2.5	80.47	83.96	84.51	82.14	84.50	89.40
2.5-5.0	14.63	12.00	11.79	13.85	13.18	8.61
5.0-7.5	3.62	2.78	2.31	2.43	1.55	1.66
7.5-10	0.91	0.87	0.35	0.96	0.00	0.00
>10	0.38	0.38	1.04	0.62	0.78	0.33

PERCENTAGES OF NON-CARBON PARTICLES IN VARIOUS DIAMETER RANGES BY ESTIMBATED MASS OF PARTICLES

Diameter Range Engine Load (µm)	10%	25%	50%	75%	100%	100% (Light Unit FL08)
.5-2.5	9.74	8.27	3.24	7.75	7.54	8.96
2.5-5.0	23.99	18.92	5.33	18.08	17.78	17.26
5.0-7.5	24.39	21.55	5.39	14.15	10.18	10.27
7.5-10	14.26	18.58	2.36	13.66	0.00	0.00
>10	27.62	32.68	83.68	46.36	64.50	63.52

TABLE 5-6. EMISSION SUMMARY WEIGHTED RESULTS SCOTT AFB

	N	$\mathbf{O}_{\mathbf{X}}$	C	0	NMI	нС	Pl		NO _X + NMHC
Unit No.	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	lbs/gal	g/hp-hr	g/hp-hr ^a
-86 (DG09) b	0.87	44.99	0.02	0.85	0.01	0.49	0.02	0.85	45.48
NF2 ^c (FL08) d	0.20	2.92	0.09	1.23	0.01	0.14	0.02	0.27	3.06
EPA Tier 1		6.9							
EPA Tier 2				3.7				0.22	4.9

^aEPA will use an NMHC +NOx standard of 4.9 g/hp-hr for Tier 2 nonroad diesel engines.

^bThe –86 utilizes a Detroit diesel engine.

^eThe NF2 utilizes a Kubota diesel engine.

dResults shown for FL08 are not weighted, but are as emitted during a single continuous maximum load.

5.2 Hazardous Air Pollutants (HAPs)

Emissions of HAPs were quantified from the two AGE. This was accomplished by collecting a composite sample over five engine load settings (10% through 100%) for the –86 generator (DG09) and over the maximum load setting for the NF2 (FL08). The composite was collected for VOCs, PAHs, and aldehydes/ketones, those parameters that featured most prominently in past sampling episodes. An overall HAP emission factor was calculated for each AGE. The HAP emission factor from generator DG09 was almost one-third that of the emission factor from the NF2 light unit. See Table 5-7 for a detailed breakdown of detected HAPs.

5.2.1 Volatile Organic Compounds (VOC)

Speciation of VOC from a composite sample over the 10% load setting to the 100% load setting was performed for the –86 generator, and over one hour for the NF2 light unit. The detected compounds were similar to the speciated HAPs determined in historical test programs. These HAPs were naphthalene, benzene, toluene, ethylbenzene, xylene, styrene, bromomethane, and chloromethane, a number of which were detected in the exhaust stream. The portion of the HAP emission factor contributed by VOC was approximately 75%. A summary of the volatile emissions is provided in Table 5-8.

5.2.2 PAH

A PAH composite sample over engine load settings of 10% through 100% was collected for the -86 generator, and over one-hour for the NF2 light unit. All PAH compounds were non-detect above 2 • g. See Table 5-9 for more detailed information on PAH emissions.

5.2.3 Aldehyde/Ketone

A composite aldehyde/ketone sample was collected for the -86 generator over the five engine load settings, and over one hour for the NF2 light unit. Aldehyde/ketones contributed approximately equal portions of the total HAP emission factor for the NF2 light unit and the -86, approximately 25%. See Table 5-10 for more detailed aldehyde/ketone emission information.

5.3 Fuel Analysis

One composite fuel sample was taken during emission testing. Fuel samples were collected from the fuel supply line and analyzed as outlined in Table 5-11.

TABLE 5-7. AGE TESTING SCOTT AFB HAZARDOUS AIR POLLUTANTS (HAPs) EMISSION FACTOR SUMMARY Lbs/1000 lbs fuel

	-86 (DG09)	NF2 (FL08)
Exhaust Flow, dscfm	344	. 30
Average Fuel Flow, lbs/hr	5.04	2.00
Pollutant		
Formaldehyde	2.06E-02	2.59E-02
Acetaldehyde	1.93E-02	8.18E-02
Acrolein	ND	3.82E-02
Isobutraldehyde, 2-Butanone (MEK)	4.83E-03	2.95E-02
Benzene	3.87E-02	2.18E-01
Bromomethane	3.30E-03	7.04E-04
Toluene	1.88E-02	8.96E-02
Ethylbenzene	1.12E-02	3.33E-02
Methylene chloride	1.03E-02	3.52E-02
m,p-Xylene	2.13E-02	7.68E-02
o-Xylene	8.90E-03	3.65E-02
Propanal	ND	1.64E-02
Total HAPs	0.16	0.68

ND = Not Detected

TABLE 5-8. AGE TESTING EMISSION FACTOR SUMMARY VOLATILE ORGANIC COMPOUNDS (VOCs)

		-86 G	-86 Generator (DG09)	309)			NF2 Light Unit (FL08)	Jnit (FL08)	
Flow Rate ^a , dscfm			344				30	0	
Fuel Flow ^a , lbs/hr			5.04				2.00	00	
		lh/dl	hr	lbs/1,000	lbs/1,000 lbs fuel	lb/hr	hr	lbs/1,000 lbs fuel	lbs fuel
	CAS		Detection		Detection		Detection		Detection
Analyte	number	Detected	limit	Detected	limit	Detected	limit	Detected	limit
Chloromethane ^H	74-87-3		1.28E-06		2.54E-04		1.28E-06		6.40E-04
Bromomethane ^H	74-83-9	1.67E-05		3.30E-03		1.41E-06		7.04E-04	
Chloroethane	75-00-3		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Freon 11 (Trichlorofluoromethane)	75-69-4		1.28E-06		2.54E-04		1.28E-06		6.40E-04
1,1-Dichloroethane ^H	75-34-3	ī	1.79E-06		3.56E-04		1.79E-06		8.96E-04
Carbon Disulfide ^H	75-15-0		1.28E-06		2.54E-04		1.28E-06		6.40E-04
Acetone	67-64-1	1.07E-04		2.12E-02		5.38E-05		2.69E-02	
Methylene Chloride ^H	75-09-2	5.18E-05		1.03E-02		7.05E-05		3.52E-02	
trans-1,2-Dichloroethene	156-60-5		1.79E-06		3.56E-04		1.79E-06		8.96E-04
1,1-Dichloroethene ^H	75-35-4		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Vinyl Acetate ^H	108-05-4		6.41E-06		1.27E-03		6.41E-06		3.20E-03
cis-1,2-Dichloroethene ^H	156-59-2		1.79E-06		3.56E-04		1.79E-06		8.96E-04
2-Butanone (Methyl Ethyl Ketone) H	78-93-3	2.43E-05		4.83E-03		5.89E-05		2.95E-02	
Chloroform ^H	67-66-3		1.79E-06		3.56E-04		1.79E-06		8.96E-04
1,1,1-Trichloroethane ^H	71-55-6		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Carbon Tetrachloride ^H	56-23-5		1.28E-06		2.54E-04		1.28E-06		6.40E-04
Benzene ^H	71-43-2	1.95E-04		3.87E-02		4.36E-04		2.18E-02	
1,2-Dichloroethane ^H	107-06-2		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Bromodichloromethane	75-27-4		1.28E-06		2.54E-04		1.28E-06		6.40E-04
cis-1,3-Dichloropropene ^H	10061-01-5		1.79E-06		3.56E-04		1.79E-06		8.96E-04
trans-1,3-Dichloropropene ^H	10061-02-6		1.79E-06		3.56E-04		1.79E-06		8.96E-04
4-Methyl-2-pentanone (MIBK) ^H	108-10-1		6.41E-06	"	1.27E-03		6.41E-06		3.20E-03
Toluene ^H	108-88-3	9.48E-05		1.88E-02		1.79E-04		8.96E-02	
1.1,2-Trichloroethane ^H	79-00-5		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Tetrachloroethene ^H	127-18-4		1.79E-06		3.56E-04		1.79E-06		8.96E-04
2-Hexanone	591-78-6		6.41E-06		1.27E-03		6.41E-06		3.20E-03

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		98-	-86 Generator (DG09)	G09)			NF2 Light Unit (FL08)	nit (FL08)	
Flow Rate ^a , dscfm			344				30		
Fuel Flow ^a , lbs/hr			5.04				2.00		
		1	lb/hr	lbs/1,00	lbs/1,000 lbs fuel	-	lb/hr	lbs/1,000	lbs/1,000 lbs fuel
	CAS		Detection		Detection		Detection		Detection
Analyte	number	Detected	limit	Detected	limit	Detected	limit	Detected	limit
Dibromochloromethane	124-48-1		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Chlorobenzene ^H	108-90-7		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Ethyl Benzene ^H	100-41-4	5.64E-05		1.12E-02		6.66E-05		3.33E-02	
m,p-Xylene ^H	108-38-3	1.07E-04		2.13E-02		1.54E-04		7.68E-02	
o-Xyfene ^H	95-47-6	4.48E-05		8.90E-03		7.30E-05		3.65E-02	
Styrene ^H	100-42-5		1.28E-06		2.54E-04		1.28E-06		6.40E-04
Bromoform ^H	75-25-2		1.28E-06		2.54E-04		1.28E-06		6.40E-04
1,1,2,2-Tetrachloroethane ^H	79-34-5		1.79E-06		3.56E-04		1.79E-06		8.96E-04
1,3-Butadiene ^H	106-99-0		6.41E-06		1.27E-03		6.41E-06		3.20E-03
1,2-Dichloropropane	78-87-5		1.79E-06		3.56E-04		1.79E-06		8.96E-04
Trichloroethene	79-01-6		1.79E-06		3.56E-04		1.79E-06		8.96E-04
			,						

*The exhaust flow rate and fuel flow represent a weighted average based upon the amount of sample time spent at each setting.

Hazardous air pollutant (HAP)

TABLE 5-9. AGE TESTING EMISSION FACTOR SUMMARY POLYNUCLEAR AROMATIC HYDROCARBONS

			-86 Generator (DG09)	tor (DG09)			NF2 Light	NF2 Light Unit (FL08	
Flow Rate ^a , dscfm			35	344				30	
Fuel Flow ^a , lbs/hr			5.(5.04			2	2.00	
		q	lb/hr	1bs/1,00	lbs/1,000 lbs fuel	91	lb/hr	lbs/1,00	lbs/1,000 lbs fuel
	CAS		Detection		Detection		Detection		Detection
Analyte	Number	Detected	Limit	Detected	Limit	Detected	Limit	Detected	Limit
Naphthalene ^H	91-20-3		1.80E-04		3.56E-02		1.190E-05		5.97E-03
2-Methylnapthlene	91-57-6		1.80E-04		3.56E-02		1.190E-05		5.97E-03
2-Chloronapthalene	91-58-7		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Acenaphthene	83-32-9		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Acenaphthylene ^H	208-96-8		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Fluorene	86-73-7		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Phenanthrene ^H	8-10-58		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Anthracene ^H	120-12-7		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Fluoranthene ^H	206-44-0		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Pyrene ^H	129-00-0		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Chrysene ^H	218-01-9		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Benzo(a)anthracene ^H	56-55-3		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Benzo(b)fluoranthene ^H	205-99-2		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Benzo(k)fluoranthene ^H	207-08-9		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Benzo(a)pyrene ^H	50-32-8		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Indeno(1,2,3-c,d)pyrene ^H	193-3-5		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Dibenzo(a,h)anthracene ^H	53-70-3		1.80E-04		3.56E-02		1.190E-05		5.97E-03
Benzo(g,h,l)perylene ^H	191-24-2		1.80E-04		3.56E-02		1.190E-05		5.97E-03

**The exhaust flow rate and fuel flow represent a weighted average based upon the amount of sample time spent at each setting.

Hazardous Air Pollutant (HAP)

Note: Unless shown as detected, result was less than the reporting limit (<2.0 ug/sample).

EMISSION FACTOR SUMMARY ADELHYDE/KETONES TABLE 5-10. AGE TESTING

		-86 Genera	86 Generator (DG09)			NF2 Light Unit (FL08)	Unit (FL08)	
Flow Rate", dscfm		3,	344			30	0	
Fuel Flow", lbs/hr		5.0	5.04			2.00	00	
	91	lb/hr	lbs/1,00	lbs/1,000 lbs fuel	qı	lb/hr	lbs/1,00	lbs/1,000 lbs fuel
Anglyte	Detected	Detection Limit	Datacted	Detection I imit	Detected	Detection I imit	Detected	Detection I imit
Formaldehyde	1.04E-03	Lunur	2.06E-01		5.18E-05		2.59E-01	
Acetaldehyde ^H	9.74E-04		1.93E-01		1.64E-04		8.18E-02	
Acrolein ^H		3.38E-05		6.70E-03	6.70E-03 7.64E-05		3.82E-02	
Propanal (Propionaldehyde) ^H		3.38E-05		6.70E-03	6.70E-03 3.27E-05		1.64E-02	
Crotonaldehyde	1.17E-04		2.32E-02		3.55E-05		1.77E-02	
Isobutraldehyde / Methyl Ethyl Ketone ^H		3.38E-05		6.70E-03	6.70E-03 3.550E-05		1.77E-02	
Benzaldehyde		3.38E-05		6.70E-03	6.70E-03 3.00E-05		1.50E-02	
Isopentanal (Isovaleraldehyde)		3.38E-05		6.70E-03		1.50E-05		7.50E-03
Pentanal (Valeraldehyde)		3.38E-05		6.70E-03		1.50E-05		7.50E-03
o-Tolualdehyde		3.38E-05		6.70E-03		1.50E-05		7.50E-03
Hexanal (Hexaldehyde)		3.38E-05		6.70E-03		1.50E-05		7.50E-03
m, p-Tolualdehyde		3.38E-05		6.70E-03		1.50E-05		7.50E-03
								The same of the sa

^aThe exhaust flow rate and fuel flow represent a weighted average based upon the amount of sample time spent at each setting.

⁺ - Hazardous Air Pollutant (HAP)

Note: Unless shown as detected, result was less than the reporting limit (<26 ug/sample for DG09 and <110 ug/sample for FL08).

TABLE 5-11. FUEL ANALYSIS

Parameter	Analytical Method	BioDiesel
Btu/lb	ASTM D-240	19,035
Sulfur %	ASTM D-5453	0.026
Carbon %	ASTM D-5291	84.89
Nitrogen ppm	ASTM 4629	51
Hydrogen %	ASTM D-5291	12.96
Ash %	ASTM D482	0.002
Naphthenes %	PONA Analysis	17.7
Aromatics %	PONA Analysis	37.1
Paraffins %	PONA Analysis	26.6
Olefins % ^a	PONA Analysis	TRACE
Oxygenates ^b	PONA Analysis	18.6

^{*}Olefinic hydrocarbons not including unsaturation with methylsoyate.

bAs methylsoyate

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SECTION 6

QUALITY ASSURANCE PROCEDURES

6.1 Quality Control Procedures

As part of the engine testing program, EQ implemented a quality assurance (QA) and quality control (QC) program. QA/QC are defined as follows:

- Quality Control The overall system of activities whose purpose is to provide a quality product or service (e.g., the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process).
- Quality Assurance A system of activities whose purpose is to provide assurance that the overall QC is being conducted effectively.

Field Personnel for stack sampling were responsible for implementation of field QA/QC procedures. Individual laboratory managers were responsible for implementation of analytical QA/QC procedures. The overall Project Manager oversaw all QA/QC procedures to ensure that sampling and analyses met the QA/QC requirements and that accurate data results from the test program were obtained.

Detailed descriptions of these QA/QC procedures are included in the Clean Cam Technology –86 Demonstration Scientific and Technical Emission Summary Test Report, Section 6. Documentation pertaining to QA/QC is found in Appendix D.

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APPENDIX A EXAMPLE CALCULATIONS



NOMENCLATURE AND DIMENSIONS

An = Cross-sectional area of sampling nozzle, sq.ft.

As = Cross-sectional area of stack, sq.ft.

Bws = Proportion by volume of water vapor in the gas stream, dimensionless

Cp = Pitot tube coefficient, dimensionless

Cs = Concentration of pollutant matter in stack gas – dry basis, grains per standard cubic foot (gr/dscf)

% CO = Percent of carbon monoxide by volume, dry basis

% CO₂ = Percent of carbon dioxide by volume, dry basis

 Average pressure drop across the sampling meter flow orifice, inches of water (in.H₂0)

GCV = Gross calorific value, Btu/lb

I = Percent of isokinetic sampling

La = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.020 cubic foot per minute or 4% of the average sampling rate, whichever is less

Md = Dry molecular weight, lb/lb-mole

Mn = Total amount of pollutant matter collected, milligrams (mg)

Ms = Molecular weight of stack gas (wet basis), lb/lb-mole

% N₂ = Percent of nitrogen by volume, dry basis

 $\% O_2$ = Percent of oxygen by volume, dry basis

 ΔP = Velocity head of stack gas, inches of water (in.H₂O)

Pbar = Barometric pressure, inches of mercury (in Hg)

NOMENCLATURE AND DIMENSIONS (continued)

Ps = Absolute stack gas pressure, inches of mercury (in Hg)

Pstd = Gas pressure at standard conditions, inches of mercury (29.92 in.Hg)

pmr = Pollutant matter emission rate, pounds per hour (lb/h)

Qs = Volumetric flow rate – wet basis at stack conditions, actual cubic feet per minute (acfm)

Qsstd = Volumetric flow rate – dry basis at standard conditions, dry standard cubic feet per minute (dscfm)

Tm = Average temperature of dry gas meter, °R

Ts = Average temperature of stack gas, °R

Tstd = Temperature at standard conditions, (528°R)

Vlc = Total volume of liquid collected in impingers and silica gel, ml

Vm = Volume of dry gas sampled at meter conditions, cu. ft.

Vmstd = Volume of dry gas sampled at standard conditions, cu ft.

Vs = Average stack gas velocity at stack conditions, ft/s

Vwstd = Volume of water vapor at standard conditions, scf

Y = Dry gas meter calibration factor, dimensionless

ø = Total sampling time, minutes

NOTE: Standard condition = 68°F and 29.92 in.Hg

EXAMPLE CALCULATIONS FOR POLLUTANT EMISSIONS

Volume of dry gas sampled corrected to standard conditions, ft³.
 Note: Vm must be corrected for leakage if any leakage rates exceed La.

$$Vmstd = 17.647 \text{ x Vm x Y} \left[\frac{Pbar + \frac{\Delta H}{13.6}}{TM, \circ R} \right]$$

2. Volume of water vapor at standard conditions, ft³.

$$Vwstd = 0.04707 \times Vlc$$

3. Moisture content in stack gas, dimensionless.

$$Bws = \frac{Vwstd}{Vwstd + Vmstd}$$

4. Dry molecular weight of stack gas, lb/lb-mole.

$$Md = 0.44 (\% CO_2) + 0.32 (\% O_2) + 0.28 (\% N_2 + \% CO)$$

5. Molecular weight of stack gas, lb/lb-mole.

$$Ms = Md(1-Bws) + 18Bws$$

6. Stack velocity at stack conditions, f/s.

$$Vs = (85.49) (Cp) \left(avg \sqrt{\Delta} P\right) \sqrt{\frac{Ts, R}{(Ps)(Ms)}}$$

7. Stack gas volumetric flow rate at stack conditions, cfm.

$$Os = 60 \times Vs \times As$$

8. Dry stack gas volumetric flow rate at standard conditions, cfm.

$$Q sstd = (17.647) (Qs) \left(\frac{Ps}{Ts}\right) (1 - Bws)$$

EXAMPLE CALCULATIONS FOR POLLUTANT EMISSIONS (continued)

9. Isokinetic Rate, %.

$$Iso = \frac{(0.0945 \times Ts, ^{\circ}R \times Vmstd)}{(1 - Bws) \times (\theta \times Vs \times Ps \times (0.005454 \times Dn^{2}))}$$

10. Concentration in gr/dscf.

$$Cs = (0.01543) \left(\frac{Mn}{Vmstd} \right)$$

11. Pollutant mass emission rate, lb/h.

pmr, lb/hr =
$$\left(\frac{Cs}{7000}\right)$$
x Qsstd x 60

12. Pollutant mass emission rate, lb/MM Btu.

pmr, 1b / M M B tu =
$$\left(\frac{pmr, lb/hr}{M M B tu/hr}\right)$$

13 F-factor (Fd).

$$Fd = \frac{10^{6} (3.64 \times \% H) + (153 \times \% C) + (0.57 \times \% S) + (0.14 \times \% N) - (0.46 \times \% 0_{2})}{GCV (Btu/lb)}$$

14. F-factor, pollutant mass emission rate, lb/MM Btu (O₂-based).

$$= \frac{1b / dscf x F x 20.9}{(20.9 - \% O_2)}$$

15. Heat input, MM Btu/hr fuel.

$$= \frac{GVC(Btu/lb)*Feed Rate(lb/hr)}{10^6}$$

16. Heat input, MM Btu/hr, F-factor.

$$= \frac{\text{Q sstd}}{\text{Fd}} \times \left[(20.9 - \% \text{ O}_2) + 20.9 \right] \times 60$$



EXAMPLE CALCULATIONS FOR GASEOUS POLLUTANTSMEASURED BY CONTINUOUS EMISSION MONITORS (CEMs)

1) Concentrations, parts per million, dry basis:

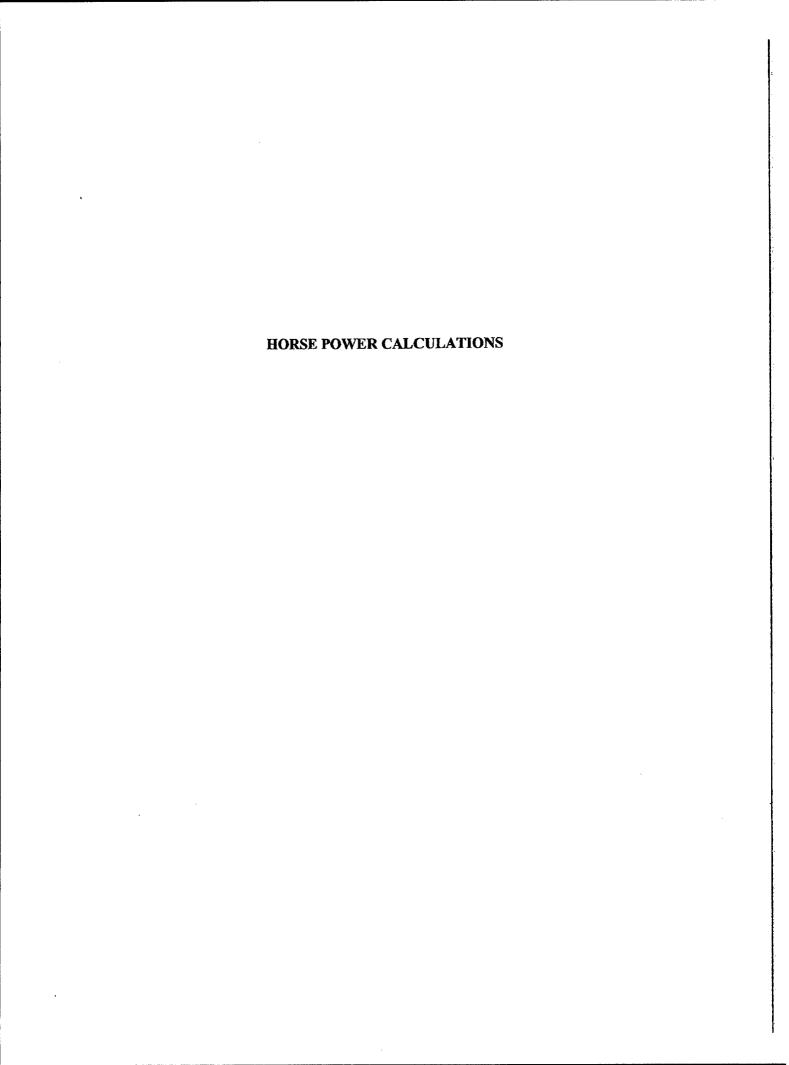
ppm, dry = ppm, wet basis
$$\div \left(1 - \frac{BWS, \%}{100}\right)$$

2) Pollutant Mass Emission Rate, pounds per hour.

PMR, lb/hr =
$$\frac{ppm, dry \times Compound Molecular Weight}{(385.3 \times 10^6)} \times dscfm \times 60$$

Molecular Weights of Target Compounds

TGO	=	Total Gaseous Organics	16.01 (Methane)
SO_2	=	Sulfur Dioxide	64.05
NO_2	=	Nitrogen Oxides	46.00
CO	=	Carbon Monoxide	28.01
BWS	=	Proportion by Volume of Wat	er Vapor in the Gas Stream
PMR	=	Pollutant Mass Emission Rate	, pounds per hour
DSCFM	=	Dry standard cubic feet per m	inute



% Load	amps	volts	Fuel Usage	x	kilowatts	HP	lb/hr*hp
10) 2	208	3 21.41	1 732051	8.105998	10 87014	1 969615
2	5 10	0 208	3 26.6	1.732051	32 42399	43 48057	0.611767
50) 13	0 208	3 40 53	1 732051	42.15119	56.52474	0 717031
7	5 20	0 208	50.68	1.732051	64.84798	86.96114	0.582789
100	24	5 208	3 49.7	1 732051	79.43878	106.5274	0 466547

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CEM – GASEOUS POLLUTANTS (CO, CO₂, O₂, THC, NO_X) – -86 Generator

9/8/2003 Run: 10-1 Horsepower: 22 Fuel Usage (Gal/hr): Flow (dscfm): 360 Moisture (%): 3.7 CO2 O2 Pollutant NOx NO CO THC Methane Concentration (ppm or %) 1337.00 922.00 36.80 63.14 3.90 4.2 16.2 3.48E-03 Mass Rate (lb/hr) 3.43 2.37 0.06 5.64E-02 9.81E-01 | 6.76E-01 1.61E-02 9.95E-04 Mass Rate (lb/Gal. Fuel) 1.64E-02 0.07 Mass Rate (gr/HP*hr) 70.84 48.85 1.19 1.16

Run:	10-2			Horsepower:	22		
Flow (dscfm):	343			Fuel Usage (Gal/hr):	3.6		
Moisture (%):	4						
Pollutant	NOx	NO	CO	THC	Methane	CO2	02
Concentration (ppm or %)	1315.00	885.00	36.40	46.15	3.60	4.2	16.1
Mass Rate (lb/hr)	3.22	2.16	0.05	3.93E-02	3.06E-03	_	
Mass Rate (lb/Gal. Fuel)	8.94E-01	6.01E-01	1.51E-02	1.09E-02	8.51E-04		
Mass Rate (gr/HP*hr)	66.38	44.67	1.12	0.81	0.06		

Run:	10-3			Horsepower:	22		
Flow (dscfm):	354	1		Fuel Usage (Gal/hr):	3.8		
Moisture (%):	3.8	[]					
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	1300.00	856.00	36.10	44.59	3.50	4.1	16.1
Mass Rate (lb/hr)	3.28	2.16	0.06	3.92E-02	3.07E-03		
Mass Rate (lb/Gal. Fuel)	8.64E-01	5.69E-01	1.46E-02	1.03E-02	8.09E-04		
Mass Rate (gr/HP*hr)	67.73	44.60	1.14	0.81	0.06		-

9/9/2003

3 Run:	25-1			Horsepower:	51		
Flow (dscfm):	352			Fuel Usage (Gal/hr):	4.3		
Moisture (%):	4.6						
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	1411.00	904.00	37.70	49.69	3.20	4.3	15.9
Mass Rate (lb/hr)	3.54	2.27	0.06	4.34E-02	2.79E-03	-	
Mass Rate (lb/Gal. Fuel)	8.24E-01	5.28E-01	1.34E-02	1.01E-02	6.50E-04	_	
Mass Rate (gr/HP*hr)	31.53	20.20	0.51	0.39	0.02	_	

Run:	25-2			Horsepower:	51		
Flow (dscfm):	•			Fuel Usage (Gal/hr):	4.4		
Moisture (%):						'	
Pollutant	NOx	NO	CO	THC	Methane	CO2	Q2
Concentration (ppm or %)	1494.00	952.00	39.00	45.10	3.00	4.4	15.6
Mass Rate (lb/hr)	0,00	0.00	0.00	0.00E+00	0.00E+00	-	
Mass Rate (lb/Gal. Fuel)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-	
Mass Rate (gr/HP*hr)	0.00	0.00	0.00	0.00	0.00		

Run:	25-3			Horsepower:	. 51		
Flow (dscfm):				Fuel Usage (Gal/hr):	4.5		
Moisture (%):							
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	195.30	195.30	98.30	79.10	1.10	4.1	15.2
Mass Rate (lb/hr)	0.00	0.00	0.00	0.00E+00	0.00E+00		
Mass Rate (lb/Gal. Fuel)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		war
Mass Rate (gr/HP*hr)	0.00	0.00	0.00	0.00	0.00		

9/9/2003

3 Run:	50-1			Horsepower:	81.4		
Flow (dscfm):	347			Fuel Usage (Gal/hr):	5.1		
Moisture (%):	5.2						
Pollutant	NOx	NO	CO	THC	Methane	CO2	02
Concentration (ppm or %)	1730.00	1149.00	43.40	52.00	0.40	4.9	14.7
Mass Rate (lb/hr)	4.28	2.84	0.07	4.48E-02	3.44E-04		
Mass Rate (lb/Gal. Fuel)	8.39E-01	5.58E-01	1.28E-02	8.78E-03	6.75E-05	**	
Mass Rate (gr/HP*hr)	23.88	15.86	0.36	0.25	0.00		

Run:	50-2			Horsepower:	81.4		
Flow (dscfm):	354			Fuel Usage (Gal/hr):	5		
Moisture (%):	4.3						
Pollutant	NOx .	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	1752.00	1168.00	43.00	48.69	0.40	4.9	14.6
Mass Rate (lb/hr)	4.42	2.95	0.07	4.27E-02	3.51E-04		
Mass Rate (lb/Gal. Fuel)	8.85E-01	5.90E-01	1.32E-02	8.55E-03	6.89E-05		
Mass Rate (gr/HP*hr)	24.67	16.45	0.37	0.24	0.00	_	-

Run:	50-3			Horsepower:	81.4		
Flow (dscfm):	v (dscfm): 352		Fuel Usage (Gal/hr):		4.95		
Moisture (%):	4.7					<u>'</u>	
Pollutant	NOx	NO	CO	THC	Methane	CO2	02
Concentration (ppm or %)	1741.00	1245.00	42.40	44.07	0.20	4.8	14.7
Mass Rate (lb/hr)	4.37	3.13	0.06	3.85E-02	1.75E-04		
Mass Rate (lb/Gal. Fuel)	8.83E-01	6.31E-01	1.31E-02	7.77E-03	3.53E-05	_	
Mass Rate (gr/HP*hr)	24.38	17.43	0.36	0.21	0.00	_	

9/9/2003

Run:	75-1			Horsepower:	116		_
Flow (dscfm):	347			Fuel Usage (Gal/hr):	6.35		
Moisture (%):	6.4						
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	2310.00	1517.00	81.10	55.02	0.10	6.2	12.8
Mass Rate (lb/hr)	5.72	3.75	0.12	4.73E-02	8.61E-05		
Mass Rate (lb/Gal. Fuel)	9.00E-01	5.91E-01	1.92E-02	7.46E-03	1.36E-05	-	
Mass Rate (gr/HP*hr)	22.37	14.69	0.48	0.19	0.00		

Run:	75-2			Horsepower:	116		
Flow (dscfm):	343			Fuel Usage (Gal/hr):	6.44		
Molsture (%):	6.5						
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	2308.00	1517.00	76.20	40.00	0.00	6.2	12.8
Mass Rate (lb/hr)	5 .65	3.71	0.11	3.40E-02	0.00E+00		_
Mass Rate (tb/Gal. Fuel)	8.77E-01	5.76E-01	1.76E-02	5.28E-03	0.00E+00		
Mass Rate (gr/HP*hr)	22.10	14.52	0.44	0.13	0.00		

Run:	75-3			Horsepower:	116		
Flow (dscfm):	343		Fuel Usage (Gal/hr):		6.38		
Moisture (%):	6.3						
Pollutant	NOx .	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	2224.00	1461.00	73.10	40.77	0.00	6.1	12.9
Mass Rate (lb/hr)	5.44	3.57	0.11	3.47E-02	0.00E+00	-	
Mass Rate (lb/Gal. Fuel)	8.53E-01	5.60E-01	1.71E-02	5.44E-03	0.00E+00		_
Mass Rate (gr/HP*hr)	21.29	13.99	0.43	0.14	0.00		

9/10/2003	Run:	100-1			Horsepower:	120		· <u>·</u> ··
	Flow (dscfm):	359			Fuel Usage (Gal/hr):	5.95		
	Moisture (%):	5.6						
	Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
	Concentration (ppm or %)	2041.00	1262,00	42.90	38.67	0.00	5.4	13.7
	Mass Rate (lb/hr)	5.23	3.23	0.07	3.44E-02	0.00E+00		
	Mass Rate (lb/Gal. Fuel)	8.78E-01	5.43E-01	1.12E-02	5.79E-03	0.00E+00		
	Mass Rate (gr/HP*hr)	19.77	12.22	0.25	0.13	0.00		

Run:	100-2			Horsepower:	120		
Flow (dscfm):	342			Fuel Usage (Gal/hr):	5.55		
Moisture (%):	5.8						
Pollutant	. NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	2000.00	1377.00	45.50	43.52	0.00	5.6	13.3
Mass Rate (lb/hr)	4.88	3.36	0.07	3.69E-02	0.00E+00		
Mass Rate (lb/Gal, Fuel)	8.79E-01	6.05E-01	1.22E-02	6.65E-03	0.00E+00	-	
Mass Rate (gr/HP*hr)	18.46	12.71	0.26	0.14	0.00		

Run:	100-3			Horsepower:	120		
Flow (dscfm):	333			Fuel Usage (Gal/hr)	6.9		
Moisture (%):	5.8					•	
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	2004.00	1368.00	45.80	44.90	0.00	5.6	13.6
Mass Rate (lb/hr)	4.76	3.25	0.07	3.71E-02	0.00E+00		
Mass Rate (lb/Gal. Fuel)	6.90E-01	4.71E-01	9.59E-03	5.37E-03	0.00E+00		
Mass Rate (gr/HP*hr)	18.01	12.29	0.25	0.14	0.00		

CEM – GASEOUS POLLUTANTS (CO, CO₂, O₂, THC, NO_X) -NF2 Lighting Unit AGE 9/10/2003

Run:	L-1			Horsepower:	20		
Flow (dscfm):	30			Fuel Usage (Gal/hr):	0.27		
Moisture (%):	3.5						
Pollutant	NOx	NO	CO	THC	Methane	CO2	O2
Concentration (ppm or %)	277.60	192.00	181.40	36.58	0.00	4.1	14.9
Mass Rate (lb/hr)	0.06	0.04	0.02	2.72E-03	0.00E+00		
Mass Rate (lb/Gal. Fuel)	2.20E-01	1.52E-01	8.75E-02	1.01E-02	0.00E+00		
Mass Rate (gr/HP*hr)	1.35	0.93	0.54	0.06	0.00		

Run:	L-2			Horsepower:	20		
Flow (dscfm):	42			Fuel Usage (Gal/hr):	0.27		
Moisture (%):	5.3						
Pollutant	NOx	NO	CO	THC	Methane	CO2	02
Concentration (ppm or %)	243.00	198.10	180.90	38.01	0.00	4.1	15.1
Mass Rate (lb/hr)	0.07	0.06	0.03	3.96E-03	0.00E+00		
Mass Rate (lb/Gal. Fuel)	2.70E-01	2.20E-01	1.22E-01	1.47E-02	0.00E+00	+-	-
Mass Rate (gr/HP*hr)	1.65	1.35	0.75	0.09	0.00		

Run:	L-3			Horsepower:	20	*	
Flow (dscfm):	30			Fuel Usage (Gal/hr):	0.27		
Moisture (%):	5						
Pollutant	NOx	NO	CO	THC	Methane	CO2	02
Concentration (ppm or %)	261.10	196.80	176.40	36.63	0.00	4.3	15.3
Mass Rate (lb/hr)	0.06	0.04	0.02	2.73E-03	0.00E+00		-
Mass Rate (lb/Gat. Fuel)	2.07E-01	1.56E-01	8.51E-02	1.01E-02	0.00E+00	-	
Mass Rate (gr/HP*hr)	1.27	0.96	0.52	0.06	0.00		

PARTICULATE -86 GENERATOR

Summary of Stack Gas Parameters and Test Results

Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 10% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	10-5-1 9/8/2003 1513-1613	10-5-2 9/8/2003 1637-1737	10-5-3 9/8/2003 1752-1852	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H₂O	4 60	3.50	3.50	3.87
у	Meter Box Correction Factor	1 006	1 006	1.006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 65	30 65	30 65	30 65
V _m	Sample Volume, ft ³	49.829	48.547	43 733	47 370
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1.2688	1.3693	1.4101	1.3494
DH	Avg Meter Orifice Pressure, in H ₂ O	2.20	2 13	1.60	1 98
T _m	Average Meter Temperature, °F	88	91	92	90
Ts	Average Stack Temperature, °F	300	449	510	420
V _{Ic}	Condensate Collected, ml	40 4	42.9	36 7	40 0
CO₂	Carbon Dioxide content, % by volume	4.2	4.2	4 1	4.2
O ₂	Oxygen content, % by volume	16.2	16 1	16 1	16.1
N ₂	Nitrogen content, % by volume	79 6	79 7	79.8	79.7
C _p	Pitot Tube Coefficient	0 99	0 99	0.99	0 99
,	Circular Stack? 1=Y,0≈N	1	1	1	
As	Diameter or Dimensions, inches	4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D _n	Nozzle Diameter, inches	0 195	0 195	0 183	0 191
	CALCULATED DATA				
A _n	Nozzle Area, ft ^c	0 000207	0 000207	0 000183	0 000199
V _{m(std)}	Standard Meter Volume, ft ³	49 718	48.211	43.297	47.075
V _{m(std)}	Standard Meter Volume, m°	1 408	1.365	1.226	1.333
Q_{m}	Average Sampling Rate, dscfm	0 829	0 804	0 722	0 785
Ps	Stack Pressure, inches Hg	30.99	30.91	30 91	30 93
B _{ws}	Moisture, % by volume	37	4 0	3.8	3.8
B _{ws(sat)}	Moisture (at saturation), % by volume	445 6	2867.2	5139 7	2817 5
V_{wstd}	Standard Water Vapor Volume, ft ^a	1 9 02	2.019	1 727	1 883
1-B _{ws}	Dry Mole Fraction	0 963	0 960	0 962	0.962
M₀	Molecular Weight (d b), lb/lb-mole	29.32	2 9 32	29 30	29 31
Ms	Molecular Weight (w b), lb/lb•mole	28 90	28.86	28.87	28 88
V_s	Stack Gas Velocity, ft/s	98 9	117 0	124.4	113.4
Α	Stack Area, ft ²	0.1	01	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	518	613	652	594
Q _s	Stack Gas Volumetric flow, dscfm	359	353	352	355
Q_s	Stack Gas Volumetric flow, dscmm	10	10	10	10
l l	Isokinetic Sampling Ratio, %	97.2	95.9	97.9	97.0

Summary of Stack Gas Parameters and Test Results Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 10% Loading

Page	2	of	2
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	RUN NUMBER RUN DATE RUN TIME	10-5-1 9/8/2003 1513-1613	10-5-2 9/8/2003 1637-1737	10-5-3 9/8/2003 1752-1852	Average
•	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	12.2	5.9	8.45	
PM	Beaker Weight Gain, mg	11.65	11.75	13.8	
PM	Total Catch, g	0 0239	0 0177	0.0223	0 0213
C _{PM}	Concentration, gr/dscf	7.40E-03	5.65E-03	7.93E-03	6.99E-03
Cpm	Concentration, lb/dscf	1.06E-06	8.07E-07	1.13E-06	9.99E-07
E _{PM}	Emission Rate, lb/hr	2.28E-02	1.71E-02	2.39E-02	2.13E-02
	Condensible Matter				
PM	Organic Gain, mg	12.3	12.2	12.4	
PM	Aqueous Gain, mg	19.3	14	18.9	
PM	Total Catch, g	0 0316	0 0262	0 0313	0.03
CPM	Concentration, gr/dscf	9.81E-03	8.39E-03	1.12E-02	9.78E-03
CPM	Concentration, lb/dscf	1.40E-06	1.20E-06	1.59E-06	1.40E-06
E _{PM}	Emission Rate, lb/hr	3.02E-02	2.53E-02	3.37E-02	2.97E-02
	Total Particulate Matter				
PM	Total Catch, g	5 55E-02	4 39E-02	5 36E-02	0.05
CPM	Concentration, gr/dscf	1.72E-02	1.40E-02	1.91E-02	1.68E-02
CPM	Concentration, lb/dscf	2.46E-06	2.01E-06	2.73E-06	2.40E-06
V PM	•		4.24E-02	5.76E-02	0.05

Summary of Stack Gas Parameters and Test Results

Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 25% Loading

Page 1 of 2

	RUN NUMBER RUN DATE	25-5-1 9/9/2003	25-5-2 9/9/2003	25-5-3 9/9/2003	Average
	RUN TIME	0809-0909	0925-1025	1042-1142	
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	9 00	2.50	2 50	4.67
у	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 69	30 69	30 69	30 69
V_{m}	Sample Volume, ft ³	45 611	42 175	44 423	44 070
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1.4177	1.4403	1.4572	1.4384
DH	Avg Meter Orifice Pressure, in H ₂ O	1.90	1.65	1.70	1.75
Tm	Average Meter Temperature, °F	69	78	88	78
Ts	Average Stack Temperature, °F	52 3	523	549	532
V _{ic}	Condensate Collected, ml	48 3	44 8	51 7	48.3
CO ₂	Carbon Dioxide content, % by volume	4 3	4.4	4 1	4.3
O ₂	Oxygen content, % by volume	15 9	15 6	15.2	15 6
N_2	Nitrogen content, % by volume	79 8	80 0	80 7	80 2
C _p	Pitot Tube Coefficient	0.99	0.99	0 99	0.99
,	Circular Stack? 1=Y,0=N	1	1	1	
As	Diameter or Dimensions, inches	4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D _n	Nozzle Diameter, inches	0 195	0 183	0 183	0 187
	CALCULATED DATA				
A _n	Nozzle Area, ft ²	0 000207	0 000183	0 000183	0 000191
$V_{m(std)}$	Standard Meter Volume, ft°	47 172	42 863	44 329	44 788
V _{m(std)}	Standard Meter Volume, m3	1.336	1.214	1.255	1.268
Qm	Average Sampling Rate, dscfm	0 786	0 714	0 739	0 746
Ps	Stack Pressure, inches Hg	31 35	30 87	30.87	31 03
B _{ws}	Moisture, % by volume	4 6	4 7	5.2	48
B _{ws(set)}	Moisture (at saturation), % by volume	5680.5	5768.4	7181 8	6210.2
V _{wetd}	Standard Water Vapor Volume, ft°	2.273	2 109	2.434	2 272
1-B _{ws}	Dry Mole Fraction	0 954	0.953	0 948	0 952
M _d	Molecular Weight (d b), lb/lb-mole	29.32	29 33	29.26	29.31
M _s	Molecular Weight (w.b.), lb/lb•mole	28 80	28 80	28 68	28 76
Vs	Stack Gas Velocity, ft/s	125.2	128.2	131 7	128 3
Α	Stack Area, ft ²	0.1	0.1	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	655	671	689	672
Q _s	Stack Gas Volumetric flow, dscfm	352	354	353	353
Q_s	Stack Gas Volumetric flow, dscmm	10	10	10	10
<u> </u>	Isokinetic Sampling Ratio, %	94.0	96.3	100.1	96.8

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 25% Loading Page 2 of 2

***********	RUN NUMBER RUN DATE RUN TIME	25-5-1 9/9/2003 0809-0909	25-5-2 9/9/2003 0925-1025	25-5-3 9/9/2003 1042-1142	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	12.85	5 85	1 1.95	
PΜ	Beaker Weight Gain, mg	23.6	22.85	15.5	
PM	Total Catch, g	0 0365	0 0287	0.0275	0 0309
C _{PM}	Concentration, gr/dscf	1.19E-02	1.03E-02	9.56E-03	1.06E-0
C _{PM}	Concentration, Ib/dscf	1.70E-06	1.48E-06	1.37E-06	1.51E-0
EPM	Emission Rate, lb/hr	3.60E-02	3.14E-02	2.89E-02	3.21E-0
	Condensible Matter				
PM	Organic Gain, mg	12 5	10 7	12	
PM	Aqueous Gain, mg	15.3	12.3	23.7	
PM	Total Catch, g	0 0278	0 0230	0 0357	0.0
CPM	Concentration, gr/dscf	9.09E-03	8.28E-03	1.24E-02	9.93E-0
C _{PM}	Concentration, lb/dscf	1.30E-06	1.18E-06	1.78E-06	1.42E-0
EPM	Emission Rate, lb/hr	2.74E-02	2.52E-02	3.76E-02	3.01E-0
	Total Particulate Matter				
PM	Total Catch, g	6.43E-02	5 17E-02	6 32E-02	0.0
CPM	Concentration, gr/dscf	2.10E-02	1.86E-02	2.20E-02	2.05E-0
	Concentration, lb/dscf	3.00E-06	2.66E-06	3.14E-06	2.93E-0
CPM	Concentiation, ib/usci				

Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 50% Loading

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	RUN NUMBER RUN DATE RUN TIME	50-5-1 9/9/2003 1155-1255	50-5-2 9/9/2003 1310-1410	50-5-3 9/9/2003 1424-1524	Average
•	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	3 50	3.50	4 00	3 67
у	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P_{bar}	Barometric Pressure, inches Hg	30 69	30 69	30 69	30.69
V_{m}	Sample Volume, ft ³	43 904	8 996	44 623	32.508
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1.4830	1.5000	1.5000	1.4943
DH	Avg Meter Orifice Pressure, in H₂O	1 66	0 16	1 68	1 17
Tm	Average Meter Temperature, °F	91	89	94	91
Ts	Average Stack Temperature, °F	595	617	620	611
V _{ic}	Condensate Collected, ml	50 1	8.5	46.4	35 0
CO ₂	Carbon Dioxide content, % by volume	49	4 9	4.8	4 9
O ₂	Oxygen content, % by volume	147	14 6	14.7	14.7
N ₂	Nitrogen content, % by volume	80.4	80.5	80 5	80 5
Cp	Pitot Tube Coefficient	0 99	0 99 1	0 99 1	0 99
As	Circular Stack? 1=Y,0≈N: Diameter or Dimensions, inches	1 4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
\mathbf{D}_{n}	Nozzle Diameter, inches	0.183	0 120	0 183	0 162
	CALCULATED DATA				
A_n	Nozzle Area, ft ^c	0 000183	0 000079	0 000183	0 000148
V _{m(std)}	Standard Meter Volume, ft3	43.568	8 928	44 044	32 180
V _{m(std)}	Standard Meter Volume, m3	1.234	0.253	1.247	0 911
\mathbf{Q}_{m}	Average Sampling Rate, dscfm	0 726	0 149	0 734	0.536
P_s	Stack Pressure, inches Hg	30.95	30 95	30 98	30 96
B_{ws}	Moisture, % by volume	5 1	4 3	47	4 7
B _{ws(sat)}	Moisture (at saturation), % by volume	10263 2	12047 5	12292.4	11534 4
V_{wstd}	Standard Water Vapor Volume, ft ³	2 358	0.400	2 184	1 647
1-B _{ws}	Dry Mole Fraction	0 949	0957	0 953	0.953
M_d	Molecular Weight (d b), lb/lb•mole	29.37	29 37	29.36	29 37
M_{ϵ}	Molecular Weight (w.b.), lb/lb-mole	28 79	28 88	28 82	28 83
V_s	Stack Gas Velocity, ft/s	136 6	139.4	139 6	138.5
Α	Stack Area, ft ²	0 1	0.1	0.1	0.09
Q_a	Stack Gas Volumetric flow, acfm	715	730	7 31	725
Q _s	Stack Gas Volumetric flow, dscfm	351	354	352	353
Q_s	Stack Gas Volumetric flow, dscmm	10	10	10	10
1	Isokinetic Sampling Ratio, %	98.8	46.7	99.5	81.7

Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter

Generator - 50% Loading Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	50-5-1 9/9/2003 1155-1255	50-5-2 9/9/2003 1310-1410	50-5-3 9/9/2003 1424-1524	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	16.4	2 55	14 05	
PM	Beaker Weight Gain, mg	25.7	12.85	34.7	
PM	Total Catch, g	0 0421	0 0154	0.0488	0 035
CPM	Concentration, gr/dscf	1.49E-02	2.66E-02	1.71E-02	1.95E-
CPM	Concentration, lb/dscf	2.13E-06	3.80E-06	2.44E-06	2.79E-
E _{PM}	Emission Rate, lb/hr	4.49E-02	8.08E-02	5.16E-02	5.91 E -
	Condensible Matter				
PM	Organic Gain, mg	11.3	3.4	12.6	
PM	Aqueous Gain, mg	33.5	7.5	33.8	
PM	Total Catch, g	0 0448	0 0109	0.0464	0.0
CPM	Concentration, gr/dscf	1.59E-02	1.88E-02	1.63E-02	1.70E-
CPM	Concentration, lb/dscf	2.27E-06	2.69E-06	2.32E-06	2.43E-
EPM	Emission Rate, lb/hr	4.77E-02	5.72E-02	4.91E-02	5.13E-
	Total Particulate Matter				
PM	Total Catch, g	8 69E-02	2 63E-02	9 52E-02	0.0
CPM	Concentration, gr/dscf	3.08E-02	4.55E-02	3.33E-02	3.65E-
CPM	Concentration, lb/dscf	4.40E-06	6.49E-06	4.76E-06	5.22E-
E _{PM}	Emission Rate, lb/hr	9.26E-02	1.38E-01	1.01E-01	0.1

Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 75% Loading

Page 1 of 2

MEASURED DATA Petatic y Stack Static Pressure, inches H₂O 5 00 4 .50 4 .50 4 .67 y Meter Box Correction Factor 1 006 1 1 006 1 1 006 1 1 006 1 1 006 1 006 1 1 006 1 1 006 1 1 006 1 1 006 1 1 006 1 1 006 1 006 1 1 006		RUN NUMBER RUN DATE RUN TIME	75-5-1 9/9/2003 1540-1640	75-5-2 9/9/2003 1652-1707	75-5-3 9/9/2003 1725-1825	Average
y Meter Box Correction Factor 1 006 1		MEASURED DATA				
P _{bar} Barometric Pressure, inches Hg 30.69 30.69 30.69 30.69 V _m Sample Volume, ft³ 44.648 7.694 43.054 31.799 Dp¹¹²² Average Square Root Dp, (in H₂O)¹¹²² 1.5000 1.5684 1.5684 1.5456 DH Avg Meter Orifice Pressure, in H₂O 1.70 1.18 1.60 1.49 T _m Average Meter Temperature, °F 96 93 93 94 T _s Average Stack Temperature, °F 620 750 750 707 V _{lc} Condensate Collected, ml 63.4 11.2 61.1 45.2 CO₂ Carbon Dioxide content, % by volume 62.2 6.2 6.1 6.2 O₂ Oxygen content, % by volume 81.0 81.0 81.0 81.0 81.0 N₂ Nitrogen content, % by volume 81.0 81.0 81.0 81.0 81.0 Q₂ Pitot Tube Coefficient 0.99 0.99 0.99 0.99 0.99 0.99 0.99	P _{static}	Stack Static Pressure, inches H ₂ O	5.00	4.50	4.50	4.67
P _{bst} /V _m Barometric Pressure, inches Hg 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 30 69 V _m Sample Volume, ft³ 44 648 7.694 43.054 31 799 DP 1/2 Average Square Root Dp, (in H₂O) 11/2 1 5000 1 5684 1 5684 1 5456 DH Avg Meter Orifice Pressure, in H₂O 1 70 1 18 1 60 1 49 T _m Average Stack Temperature, °F 96 93 93 94 T _s Average Stack Temperature, °F 620 750 750 707 V _c Condensate Collected, ml 63 4 11 2 61 1 45 2 CO ₂ Carbon Dioxide content, % by volume 62 2 6.2 6 1 6 2 O ₂ Oxygen content, % by volume 81 0 81 0 81 0 81 0 81 0 N ₂ Nitrogen content, % by volume 81 0 81 0 81 0 81 0 81 0		Meter Box Correction Factor	1 006	1 006	1 006	1 006
V _m Sample Volume, ft³ 44 648 7.694 43.054 31 799 DP¹¹² Average Square Root Dp, (in H₂O)¹¹² 1 5000 1 5684 1.5684 1.5456 DH Avg Meter Orifice Pressure, in H₂O 1 70 1 18 1 60 1 49 T _m Average Meter Temperature, °F 96 93 93 94 T ₆ Average Stack Temperature, °F 620 750 750 707 V ₆ Condensate Collected, ml 63 4 11 2 61 1 45 2 CO₂ Carbon Dioxide content, % by volume 62 2 6.2 6 1 6 2 O₂ Oxygen content, % by volume 12.8 12.8 12.9 12.8 N₂ Nitrogen content, % by volume 81 0 81 0 81 0 81 0 CP Pitot Tube Coefficient 0.99 0.99 0.99 0.99 Circular Stack? 1=Y,0=N¹ 1 1 1 1 1 As Diameter or Dimensions, inches: 4 00 4 00 4 00		Barometric Pressure, inches Hg	30.69	30.69	30.69	30 69
Dp 1/2 Average Square Root Dp, (in H₂O) 1/2 1.5000 1 5684 1.5684 1.5456 DH Avg Meter Orifice Pressure, in H₂O 1 70 1 18 1 60 1 49 T _m Average Meter Temperature, °F 96 93 93 94 T ₆ Average Stack Temperature, °F 620 750 750 707 V _{Ic} Condensate Collected, ml 63.4 11.2 61.1 45.2 CO₂ Carbon Dioxide content, % by volume 6.2 6.2 6.1 6.2 O₂ Oxygen content, % by volume 81.0		Sample Volume, ft ³	44 648	7.694	43.054	31 799
Tm Average Meter Temperature, °F 96 93 93 94 T ₆ Average Stack Temperature, °F 620 750 750 707 V _{1c} Condensate Collected, ml 63 4 11 2 61 1 45 2 CO ₂ Carbon Dioxide content, % by volume 62 6.2 6.1 62 O ₂ Oxygen content, % by volume 12 8 12 8 12 9 12 8 N ₂ Nitrogen content, % by volume 81 0		Average Square Root Dp, (in H ₂ O) ^{1/2}	1.5000	1 5684	1.5684	1.5456
T ₆ Average Stack Temperature, °F 620 750 750 707 V _{Ic} Condensate Collected, ml 63 4 1112 61 1 45 2 CO₂ Carbon Dioxide content, % by volume 6 2 6 2 6 1 6 2 O₂ Oxygen content, % by volume 12 8 12 8 12 9 12 8 N₂ Nitrogen content, % by volume 81 0 81 0 81 0 81 0 C₀ Pitot Tube Coefficient 0 99 0 99 0 99 0 99 Circular Stack? 1=Y,0=N¹ 1 1 1 1 As Diameter or Dimensions, inches: 4 00 4 00 4 00 4 00 Q Sample Run Duration, minutes 60 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft² 0 000183 0 000183 0 000183 0 000183 V _{m(stat)} Standard Meter Volume, ft² 43 952 7 606 42 564 <td>DH</td> <td>Avg Meter Orifice Pressure, in H₂O</td> <td>1 70</td> <td>1 18</td> <td>1.60</td> <td>1 49</td>	DH	Avg Meter Orifice Pressure, in H ₂ O	1 70	1 18	1.60	1 49
Vic Condensate Collected, ml 63 4 11 2 61 1 45 2 CO2 Carbon Dioxide content, % by volume 6.2 6.2 6.1 6.2 O2 Oxygen content, % by volume 12 8 12 8 12 9 12 8 N2 Nitrogen content, % by volume 81 0 <td>T_m</td> <td>Average Meter Temperature, °F</td> <td>96</td> <td>93</td> <td>93</td> <td>94</td>	T _m	Average Meter Temperature, °F	96	93	93	94
CO2 Carbon Dioxide content, % by volume 6.2 6.2 6.1 6.2 O2 Oxygen content, % by volume 12.8 12.8 12.9 12.8 N2 Nitrogen content, % by volume 81.0 8	T_{s}	Average Stack Temperature, °F	620	750	750	707
O₂ Oxygen content, % by volume 12.8 12.8 12.9 12.8 N₂ Nitrogen content, % by volume 81.0 8	V _{lc}	Condensate Collected, ml	63.4	11 2	61 1	45.2
N₂ Nitrogen content, % by volume 81 0 81 0 81 0 81 0 Cp Pitot Tube Coefficient 0 99 0 99 0 99 0 99 Circular Stack? 1=Y,0=N¹ 1 1 1 1 As Diameter or Dimensions, inches: 4 00 4 00 4 00 4 00 Q Sample Run Duration, minutes 60 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft² 0 000183 0.000183 0 000183 0 000183 V _{m(std)} Standard Meter Volume, ft² 43 952 7 606 42 564 31 374 V _{m(std)} Standard Meter Volume, m³ 1.245 0 215 1 205 0 888 Qm Average Sampling Rate, dscfm 0 733 0 507 0 709 0 650 Ps Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 Bws Moisture, % by volume 6 4 6.5 </td <td>CO₂</td> <td>Carbon Dioxide content, % by volume</td> <td>6.2</td> <td>6.2</td> <td>61</td> <td>6.2</td>	CO ₂	Carbon Dioxide content, % by volume	6.2	6.2	61	6.2
Cp Pitot Tube Coefficient 0.99 0.99 0.99 0.99 Circular Stack? 1=Y,0=N¹ 1 1 1 1 As Diameter or Dimensions, inches: 4 00 4 00 4 00 4 00 Q Sample Run Duration, minutes 60 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft² 0 000183 0.000183 0 000183 0 000183 Vm(std) Standard Meter Volume, ft² 43 952 7 606 42 564 31 374 Vm(std) Standard Meter Volume, ft² 43 952 7 606 42 564 31 374 Vm(std) Standard Meter Volume, ft² 1 245 0 215 1 205 0 888 Qm Average Sampling Rate, dscfm 0 733 0 507 0 709 0 650 Ps Stack Pressure, inches Hg 31 06 31 02 31 02 31 02 31 02 31 02 31 02 31 02	O ₂	Oxygen content, % by volume	12.8	12 8	12.9	12.8
Circular Stack? 1=Y,0=N¹ 1 1 1 1 1 1 As Diameter or Dimensions, inches: 4 00 4 00 4 00 4 00 4 00 4 00 As Diameter or Dimensions, inches: 4 00 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 0 183	N ₂	Nitrogen content, % by volume	81 0	81 0	81 0	81 0
As Diameter or Dimensions, inches: 4 00 4 00 4 00 4 00 Q Sample Run Duration, minutes 60 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft ² 0 000183 0 000183	Cp	Pitot Tube Coefficient	0 99	0 99	0 99	0.99
Q Sample Run Duration, minutes 60 15 60 45 Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft² 0 000183 0.000183 0 000183 0 000183 0 000183 0 000183 0 000183 0 000183 0 000183 0 000183 0 000183 0 0000183		Circular Stack? 1=Y,0=N	1	1		
Dn Nozzle Diameter, inches 0 183 0 183 0 183 0 183 CALCULATED DATA An Nozzle Area, ft² 0 000183 0.000183 0 000183		-				
CALCULATED DATA An Nozzle Area, ft ^c 0 000183 0.000183 0 000183 0 000183 V _{m(std)} Standard Meter Volume, ft ^c 43 952 7 606 42 564 31.374 V _{m(std)} Standard Meter Volume, m ^c 1.245 0.215 1.205 0 888 Q _m Average Sampling Rate, dscfm 0 733 0.507 0 709 0 650 P _s Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 B _{ws} Moisture, % by volume 64 6.5 6.3 6.4 B _{ws(sat)} Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599.2 V _{wstd} Standard Water Vapor Volume, ft ^c 2 984 0 527 2.876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0.936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft ² 0.1 0.1 0.1 0.09 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscfm 10 10 10 10		•				
An Nozzle Area, ft² 0 000183 0.000183 0 000183 0 000183 0 000183 0 000183 V _{m(std)} Standard Meter Volume, ft° 43 952 7 606 42 564 31.374 V _{m(std)} Standard Meter Volume, m° 1.245 0.215 1.205 0.888 Q _m Average Sampling Rate, dscfm 0 733 0.507 0 709 0 650 P _s Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 B _{ws} Moisture, % by volume 6 4 6.5 6.3 6.4 B _{ws} (eat) Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599.2 V _{wstd} Standard Water Vapor Volume, ft° 2 984 0 527 2.876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0 936 M _d Molecular Weight (d b), lb/lb*mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb*mole 28.77 28.76 28.76 28.77 <td>D_n</td> <td>Nozzle Diameter, inches</td> <td>0 183</td> <td>0 183</td> <td>0 183</td> <td>0 183</td>	D _n	Nozzle Diameter, inches	0 183	0 183	0 183	0 183
V _{m(std)} Standard Meter Volume, ft° 43 952 7 606 42 564 31 374 V _{m(std)} Standard Meter Volume, m° 1.245 0.215 1 205 0 888 Q _m Average Sampling Rate, dscfm 0 733 0.507 0 709 0 650 P _s Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 B _{ws} Moisture, % by volume 6 4 6.5 6.3 6.4 B _{ws} (sat) Moisture (at saturation), % by volume 12263.3 27767.1 27767.1 22599.2 V _{wstd} Standard Water Vapor Volume, ft° 2 984 0 527 2.876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0.936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Volu		CALCULATED DATA				
V _{m(std)} Standard Meter Volume, m³ 1.245 0.215 1.205 0.888 Q _m Average Sampling Rate, dscfm 0.733 0.507 0.709 0.650 P _s Stack Pressure, inches Hg 31.06 31.02 31.02 31.03 B _{ws} Moisture, % by volume 6.4 6.5 6.3 6.4 B _{ws(sat)} Moisture (at saturation), % by volume 12263.3 27767.1 27767.1 22599.2 V _{wstd} Standard Water Vapor Volume, ft³ 2.984 0.527 2.876 2.129 1-B _{ws} Dry Mole Fraction 0.936 0.935 0.937 0.936 M _d Molecular Weight (d b), lb/lb*mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb*mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric fl	A_n	Nozzle Area, ft ²	0 000183	0.000183	0 000183	0 000183
Qm Average Sampling Rate, dscfm 0 733 0.507 0 709 0 650 Ps Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 Bws Moisture, % by volume 6 4 6.5 6.3 6.4 Bws(eat) Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599 2 Vwstd Standard Water Vapor Volume, ft° 2 984 0 527 2 876 2 129 1-Bws Dry Mole Fraction 0 936 0 935 0 937 0 936 Md Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 Ms Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 Vs Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Volumetric flow, acfm 731 809 809 783 Qs Stack Gas Volumetric flow, dscfm 34	$V_{m(std)}$	Standard Meter Volume, ft ³	43 952	7 606	42 564	31.374
Ps Stack Pressure, inches Hg 31 06 31 02 31 02 31 03 Bws Moisture, % by volume 64 65 6.3 6.4 Bws(eal) Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599.2 Vwstd Standard Water Vapor Volume, ft³ 2 984 0 527 2 876 2 129 1-Bws Dry Mole Fraction 0 936 0 935 0 937 0.936 Md Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 Ms Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 Vs Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Gas Volumetric flow, acfm 731 809 809 783 Qs Stack Gas Volumetric flow, dscfm 347 342 343 344 Qs Stack Gas Volumetric flow, dscfm 10	V _{m(std)}	Standard Meter Volume, m ³	1.245	0.215	1.205	0.888
B _{ws} Moisture, % by volume 6 4 6 5 6 3 6 4 B _{ws(sat)} Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599.2 V _{wstd} Standard Water Vapor Volume, ft° 2 984 0 527 2 876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0.936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft² 0.1 0.1 0.1 0.09 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscfm 10 10 10 10	Q_{m}	Average Sampling Rate, dscfm	0 733	0.507	0 709	0.650
B _{we(sat)} Moisture (at saturation), % by volume 12263 3 27767 1 27767 1 22599.2 V _{wstd} Standard Water Vapor Volume, ft° 2 984 0 527 2 876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0 936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft² 0.1 0.1 0.1 0.0 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscmm 10 10 10 10	P _s	Stack Pressure, inches Hg	31 06	31 02	31 02	
V _{wstd} Standard Water Vapor Volume, ft³ 2 984 0 527 2.876 2 129 1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0.936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft² 0.1 0.1 0.1 0.09 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscfm 10 10 10 10	B_{ws}	Moisture, % by volume				-
1-B _{ws} Dry Mole Fraction 0 936 0 935 0 937 0.936 M _d Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 M _s Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 V _s Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft² 0.1 0.1 0.1 0.09 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscmm 10 10 10 10	$B_{ws(sat)}$	•				
Md Molecular Weight (d b), lb/lb•mole 29.50 29.50 29.49 29.50 Ms Molecular Weight (w b), lb/lb•mole 28.77 28.76 28.76 28.77 Vs Stack Gas Velocity, ft/s 139.6 154.6 154.6 149.6 A Stack Area, ft² 0.1 0.1 0.1 0.09 Qa Stack Gas Volumetric flow, acfm 731 809 809 783 Qs Stack Gas Volumetric flow, dscfm 347 342 343 344 Qs Stack Gas Volumetric flow, dscmm 10 10 10 10		•				
M _s Molecular Weight (w b), lb/lb•mole 28 77 28 76 28 76 28 77 V _s Stack Gas Velocity, ft/s 139 6 154 6 154.6 149 6 A Stack Area, ft² 0.1 0.1 0.1 0.0 Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscmm 10 10 10 10		•				
Vs Stack Gas Velocity, ft/s 139 6 154 6 154.6 149 6 A Stack Area, ft² 0.1 0.1 0.1 0.09 Qa Stack Gas Volumetric flow, acfm 731 809 809 783 Qs Stack Gas Volumetric flow, dscfm 347 342 343 344 Qs Stack Gas Volumetric flow, dscmm 10 10 10 10		_ , ,				
A Stack Area, ft² 0.1 0.1 0.1 0.09 Qa Stack Gas Volumetric flow, acfm 731 809 809 783 Qs Stack Gas Volumetric flow, dscfm 347 342 343 344 Qs Stack Gas Volumetric flow, dscmm 10 10 10 10						
Q _a Stack Gas Volumetric flow, acfm 731 809 809 783 Q _s Stack Gas Volumetric flow, dscfm 347 342 343 344 Q _s Stack Gas Volumetric flow, dscmm 10 10 10 10	-	•				
QsStack Gas Volumetric flow, dscfm347342343344QsStack Gas Volumetric flow, dscmm10101010		· · · · · · · · · · · · · · · · ·	***		77.7	
Q _s Stack Gas Volumetric flow, dscmm 10 10 10 10						
•						_
t Jookinatia Samplina Datia 9/. 100 R 70 R 90 09 0	u _s	Isokinetic Sampling Ratio, %	100.8	70.8	98.9	90.2

Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter

Generator - 75% Loading

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	RUN NUMBER RUN DATE RUN TIME	75-5-1 9/9/2003 1540-1640	75-5-2 9/9/2003 1652-1707	75-5-3 9/9/2003 1725-1825	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	50.55	36	9.2	
PM	Beaker Weight Gain, mg	28.15	11.9	17.45	
PM	Total Catch, g	0.0787	0.0155	0 0267	0 040
CPM	Concentration, gr/dscf	2.76E-02	3.15E-02	9.66E-03	2.29E-
CPM	Concentration, lb/dscf	3.95E-06	4.49E-06	1.38E-06	3.27E-0
E _{PM}	Emission Rate, lb/hr	8.22E-02	9.23E-02	2.84E-02	6.76E-
	Condensible Matter				
PM	Organic Gain, mg	19	27	17	
PM	Aqueous Gain, mg	39.7	5.7	36.6	
PM	Total Catch, g	0.0416	0.0084	0.0536	0.0
C _{PM}	Concentration, gr/dscf	1.46E-02	1.70E-02	1.94E-02	1.70E-
CPM	Concentration, lb/dscf	2.09E-06	2.43E-06	2.78E-06	2.43E-
E _{PM}	Emission Rate, lb/hr	4.35E-02	5.00E-02	5.71E-02	5.02E-
	Total Particulate Matter				
PM	Total Catch, g	1,20E-01	2 39E-02	8 03E-02	0.0
C _{PM}	Concentration, gr/dscf	4.22E-02	4.85E-02	2.91E-02	3.99E-
CPM	Concentration, lb/dscf	6.03E-06	6.93E-06	4.16E-06	5.71E-
	Emission Rate, lb/hr	1.26E-01	1.42E-01	8.55E-02	0.1

Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 100% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	100-5-1 9/10/2003 0758-0858	100-5-2 9/10/2003 0910-0925	100-5-3 9/10/2003 0945-1045	100-5-4 9/10/2003 1058-1158	Average
	MEASURED DATA					
P _{static}	Stack Static Pressure, inches H ₂ O	4 00	4 00	5.00	5.50	4 63
У	Meter Box Correction Factor	1.006	1.006	1 006	1 006	1 006
P _{bar}	Barometric Pressure, inches Hg	30.68	30.68	30.68	30.68	30.68
V_{m}	Sample Volume, ft ³	42.285	6.751	42.617	42.196	33 462
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 5692	1.5716	1.5122	1.4697	1 5307
DH	Avg Meter Orifice Pressure, in. H ₂ O	1.58	0.88	1 58	1 50	1 38
T _m	Average Meter Temperature, °F	69	74	83	90	79
T _s	Average Stack Temperature, °F	728	6 61	674	683	687
V _{lc}	Condensate Collected, ml	54 7	33	55 3	55 0	42 1
CO2	Carbon Dioxide content, % by volume	54	54	5.6	56	5.5
O ₂	Oxygen content, % by volume	13 7	13 7	13.3	13.6	13.6
N ₂	Nitrogen content, % by volume	80 9	80 9	81 1	808	80 9
C _p	Pitot Tube Coefficient	0 99	0 99	0 99	0 99	0 99
Ор	Circular Stack? 1=Y.0=N	1	1	1	1	0 33
As	Diameter or Dimensions, inches:	4 00	4 00	4.00	4 00	4 00
Q	Sample Run Duration, minutes	60	15	60	60	49
D_n	Nozzle Diameter, inches	0 183	0 183	0 183	0 183	0 183
	CALCULATED DATA					
A _n	Nozzie Area, ft ²	0 000183	0 000183	0 000183	0.000183	0 000183
V _{m(std)}	Standard Meter Volume, ft ³	43 692	6 898	42 892	41 927	33 852
V _{m(std)}	Standard Meter Volume, m°	1.237	0 195	1.215	1 187	0 959
Qm	Average Sampling Rate, dscfm	. 0 728	0 460	0.715	0.699	0.650
P_s	Stack Pressure, inches Hg	30 97	30 97	31 05	31 08	31 02
B_{ws}	Moisture, % by volume	56	2.2	57	5.8	4 8
$B_{ws(sat)}$	Moisture (at saturation), % by volume	24547 0	16255 9	17638.9	18651.0	19273.2
V_{wstd}	Standard Water Vapor Volume, ft ³	2 575	0 155	2 603	2.589	1 980
1-B _{ws}	Dry Mole Fraction	0 944	0.978	0 943	0.942	0 952
M_d	Molecular Weight (d b), lb/lb•mole	29.41	29 41	29.43	29.44	29.42
M_s	Molecular Weight (w b), lb/lb-mole	28 78	29 16	28 77	28 77	28.87
V^{e}	Stack Gas Velocity, ft/s	153.3	148.2	144.2	140 6	146 6
A	Stack Area, ft ²	0.1	0.1	0.1	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	803	77 6	755	73 6	767
Q _s	Stack Gas Volumetric flow, dscfm	349	370	344	333	349
Qs	Stack Gas Volumetric flow, dscmm	10	10	10	9	10
11	Isokinetic Sampling Ratio, %	99.8	59.4	99.4	100.4	89.7

Summary of Stack Gas Parameters and Test Results Generator Testing

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	RUN NUMBER RUN DATE RUN TIME	100-5-1 9/10/2003 0758-0858	100-5-2 9/10/2003 0910-0925	100-5-3 9/10/2003 0945-1045	100-5-4 9/10/2003 1058-1158	Average
	EMISSIONS DATA					
	Particulate Matter					
PM	Filter Weight Gain, mg	2 75	4.65	3.65	3.35	
PM	Beaker Weight Gain, mg	8.85	5.5	9.2	8.8	
PM	Total Catch, g	0 0116	0.0102	0 0129	0.0122	0.011
C _{PM}	Concentration, gr/dscf	4.10E-03	2.27E-02	4.62E-03	4.47E-03	8.98E-0
CPM	Concentration, lb/dscf	5.85E-07	3.24E-06	6.60E-07	6.39E-07	1.28E-0
E _{PM}	Emission Rate, lb/hr	1.22E-02	7. 20E-0 2	1.36E-02	1.28E-02	2.77E-0
	Condensible Matter					
PM	Organic Gain, mg	13.2	17	6.3	10.3	
PM	Aqueous Gain, mg	24.3	2	49.1	35	
PM	Total Catch, g	0 0375	0 0037	0 0554	0.0453	0.0
CPM	Concentration, gr/dscf	1.32E-02	8.28E-03	1.99E-02	1.67E-02	1.50E-0
CPM	Concentration, lb/dscf	1.89E-06	1.18E-06	2.85E-06	2.38E-06	2.14E-
E _{PM}	Emission Rate, lb/hr	3.96E-02	2.62E-02	5.87E-02	4.75E-02	4.42E-
	Total Particulate Matter					
PM	Total Catch, g	4 91E-02	1.39E-02	6.83E-02	5 75E-02	0.0
C _{PM}	Concentration, gr/dscf	1.73E-02	3.10E-02	2.46E-02	2.11E-02	2.56E-0
CPM	Concentration, lb/dscf	2.48E-06	4.43E-06	3.51E-06	3.02E-06	3.65E-
~PM				7.24E-02	6.03E-02	0.0

PARTICULATE NF2 LIGHTING UNIT AGE

Generator Testing

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US EPA Test Method 5 - Particulate Matter

Light Generator

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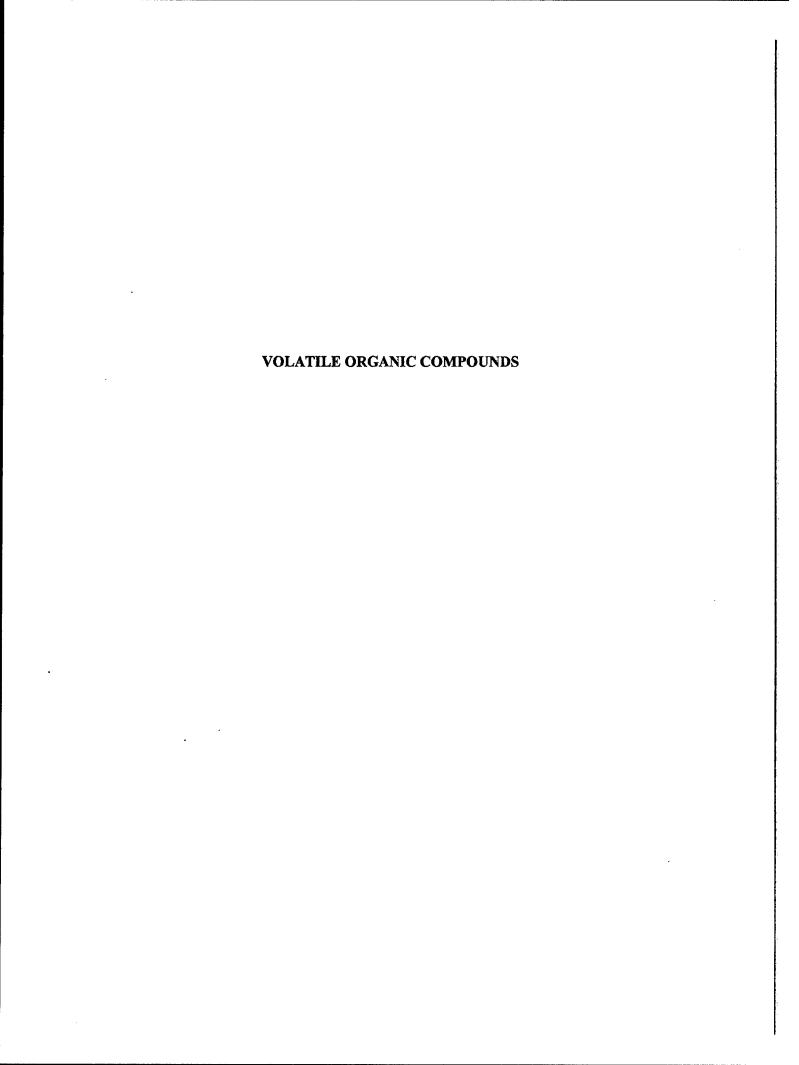
	RUN NUMBER RUN DATE RUN TIME	L-5-1 9/10/2003 1313-1413	L-5-2 9/10/2003 1429-1529	L-5-3 9/10/2003 1542-1642	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	0 01	0.01	0.01	0 01
у	Meter Box Correction Factor	1.006	1 006	1.006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 68	30 69	30.69	30.69
Vm	Sample Volume, ft ³	28.872	28 995	28 844	28.904
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	0 1039	0 1039	0 1039	0 1039
DH	Avg Meter Orifice Pressure, in H ₂ O	0 64	0.64	0.64	0 64
T _m	Average Meter Temperature, °F	91	94	95	93
T,	Average Stack Temperature, °F	263	263	263	263
V _{ic}	Condensate Collected, ml	21.6	34 0	31.9	29.2
CO2	Carbon Dioxide content, % by volume	4 1	4 1	4.3	4.2
02	Oxygen content, % by volume	14 9	15 1	15.3	15 1
N ₂	Nitrogen content, % by volume	81.0	80.8	80 4	80 7
C _p	Pitot Tube Coefficient	0 99	0 99	0 99	0.99
·	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	4.00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0.495	0.495	0.495	0.495
	CALCULATED DATA				
A _n	Nozzle Area, ft ²	0 001336	0 001336	0 001336	0 001336
V _{m(std)}	Standard Meter Volume, ft*	28.598	28 548	28 333	28.493
V _{m(std)}	Standard Meter Volume, m ³	0.810	0 808	0.802	0.807
\mathbf{Q}_{m}	Average Sampling Rate, dscfm	0.477	0.476	0 472	0.475
Ps	Stack Pressure, inches Hg	30 68	30.69	30 69	30 69
B _{ws}	Moisture, % by volume	3.4	5.3	50	4.6
B _{ws(set)}	Moisture (at saturation), % by volume	248 8	248 7	248.7	248 7
V_{wstd}	Standard Water Vapor Volume, ft ³	1 017	1 600	1.502	1.373
1-B _{ws}	Dry Mole Fraction	0.966	0 947	0 950	0.954
M _d	Molecular Weight (d b), lb/lb•mole	29.25	29.26	29.30	29.27
Ms	Molecular Weight (w b), lb/lb•mole	28 87	28 66	28 73	28 75
Vs	Stack Gas Velocity, ft/s	79	80	80	8.0
Α	Stack Area, ft ²	0.1	0.1	0.1	0 09
Q _a	Stack Gas Volumetric flow, acfm	42	42	42	42
Q _s	Stack Gas Volumetric flow, dscfm	30	30	30	30
Q,	Stack Gas Volumetric flow, dscmm	1	1	1	1 1
L	Isokinetic Sampling Ratio, %	103.5	105.0	104.0	104.2

Summary of Stack Gas Parameters and Test Results Generator Testing

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	RUN NUMBER RUN DATE RUN TIME	L-5-1 9/10/2003 1313-1413	L-5-2 9/10/2003 1429-1529	L-5-3 9/10/2003 1542-1642	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	7.55	7 75	6 65	
PM	Beaker Weight Gain, mg	5.4	4.45	4.35	
PM	Total Catch, g	0 0130	0.0122	0 0110	0.0121
CPM	Concentration, gr/dscf	6.99E-03	6.59E-03	5.99E-03	6.52E-03
CPM	Concentration, lb/dscf	9.98E-07	9.42E-07	8.56E-07	9.32E-07
E _{PM}	Emission Rate, lb/hr	1.80E-03	1.67E-03	1.52E-03	1.67E-03
	Condensible Matter				
PM	Organic Gain, mg	35	21	4	
PM	Aqueous Gain, mg	22.2	18.3	24.6	
PM	Total Catch, g	0 0257	0.0204	0 0286	0.02
CPM	Concentration, gr/dscf	1.39E-02	1.10E-02	1.56E-02	1.35E-02
CPM	Concentration, lb/dscf	1.98E-06	1.58E-06	2.23E-06	1.93E-06
E _{PM}	Emission Rate, lb/hr	3.57E-03	2.80E-03	3.96E-03	3.44E-03
	Total Particulate Matter				
PM	Total Catch, g	0 04	0 03	0 04	0.04
CPM	Concentration, gr/dscf	2.09E-02	1.76E-02	2.16E-02	2.00E-02
CPM	Concentration, lb/dscf	2.98E-06	2.52E-06	3.08E-06	2.86E-06
Epm	Emission Rate, lb/hr	5.38E-03	4.47E-03	5.48E-03	5.11E-03



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	RUN NUMBER	0030-1 (-86)	0030-2 (MF2)	
	RUN DATE	09/08/03 - 09/10/03	9/10/2003	Average
	RUN TIME	Composite	1328 - 1428	
i	MEASURED DATA			
γ	Meter Box Correction Factor	0 971	0 971	0 971
P_{bar}	Barometric Pressure, inches Hg	30 65	30 68	30 67
P _{static}	Stack Static Pressure, inches H ₂ O	5 22	0.01	2 62
V_{m}	Sample Volume, L	10 280	15.920	13 100
Δp ^{1/2}	Average Square Root Δp , (in H_2O) ^{1/2}	1 4267	0 1039	0.7653
ΔH	Avg Meter Orifice Pressure, in H ₂ O	1.85	0 63	1.24
T _m	Average Meter Temperature, °F	79	100	90
Ts	Average Stack Temperature, °F	548	263	406
V _{ic}	Condensate Collected, ml	46 7	34 5	40 6
CO ₂	Carbon Dioxide content, % by volume	5 0 0	4 17	4 59
O_2	Oxygen content, % by volume	14 70	15 1	14 90
N ₂	Nitrogen content, % by volume	80 30	80 73	80.52
C _p	Pitot Tube Coefficient	0 99	0.99	0 99
•	Circular Stack? 1=Y,0=N:	1	1	
As	Diameter or Dimensions, inches:	4 00	4 00	4 00
F	Fuel Flow, lb/hr	5 04	2 00	3 52
Θ	Sample Run Duration, minutes	50	60	5 5
	CALCULATED DATA			
V _{m(std)}	Standard Meter Volume, dscl	10 058	14 963	12 511
$V_{m(std)}$	Standard Meter Volume, dscf	0 355	0 528	0 44
Ps	Stack Pressure, inches Hg	31 03	30 68	30.86
A	Stack Area, ft²	0 09	0.09	0 09
Q_a	Stack Gas Volumetric flow, acfm	672	42	357
Qs	Stack Gas Volumetric flow, dscfm	344	30	187
Q _{s(cmm)}	Stack Gas Volumetric flow, dscmm	10	· 1	5

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	030174.0008.002						
	<u>0030-1 (-86)</u>	<u>0030-2 (MF2)</u>	<u>Average</u>				
Acetone							
Molecular Weight, g/g-mole	58.08	58 08					
Target Catch, µg	0.84	0 42	0.63				
Concentration, mg/dscm a	8.31E-02	4 18E-02	0.06				
Concentration, ppbvd b	3.44E+01	1.73E+01	25 86				
Emission Rate, lb/hr c	1.07E-04	5.38E-05	0.00				
Emission Rate, 1b/1000 lb fuel	2 12E-02	2.69E-02	0 02				
Benzene							
Molecular Weight, g/g-mole	78.11	78 11					
Target Catch, µg	1.52	3.40	2.46				
Concentration, mg/dscm a	1.51E-01	3 38E-01	0 24				
Concentration, ppbvd b	4.66E+01	1.04E+02	75.35				
Emission Rate, lb/hr c	1.95E-04	4.36E-04	0.00				
Emission Rate, lb/1000 lb fuel	3.87E-02	2 18E-01	0.13				
Bromodichloromethane							
Molecular Weight, g/g-mole	163 83	163.83					
Target Catch, µg	0.01	0 01	0.01				
Concentration, mg/dscm a	9 94E-04	9 94E-04	0 00				
Concentration, ppbvd ^b	1 46E-01	1 46E-01	0 15				
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0 00				
Emission Rate, lb/1000 lb fuel	2 54E-04	6 40E-04	0.00				
Bromoform							
Molecular Weight, g/g-mole	252.73	2 52 7 3					
Target Catch, µg	0 01	0.01	0.01				
Concentration, mg/dscm a	9 94E-04	9 94E-04	0 00				
Concentration, ppbvd b	9 46E-02	9 46E-02	0.09				
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0.00				
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00				

 $^{^{\}text{g}}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

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	0030-1 (-86)	0030-2 (MF2)	Average
Bromomethane			
Molecular Weight, g/g-mole	94 94	94 94	
Target Catch, µg	0 13	0.01	0 07
Concentration, mg/dscm 8	1.29E-02	1.09E-03	0.01
Concentration, ppbvd b	3.27E+00	2.77E-01	1 78
Emission Rate, lb/hr c	1.67E-05	1 41E-06	0.00
Emission Rate, lb/1000 lb fuel	3.30E-03	7 04E-04	0.00
2-Butanone			
Molecular Weight, g/g-mole	72 11	72 11	
Target Catch, µg	0.19	0.46	0.33
Concentration, mg/dscm a	1.89E-02	4.57E-02	0 03
Concentration, ppbvd b	6.30E+00	1 53E+01	10.78
Emission Rate, lb/hr c	2.43E-05	5 89E-05	0.00
Emission Rate, lb/1000 lb fuel	4 83E-03	2 95E-02	0.02
1,3 Butadiene			
Molecular Weight, g/g-mole	54.09	54 09	
Target Catch, µg	0.05	0 05	0 05
Concentration, mg/dscm ^a	4 97E-03	4.97E-03	0.00
Concentration, ppbvd ^b	2 21E+00	2 21E+00	2 21
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0.00
Emission Rate, lb/1000 lb fuel	1.27E-03	3 20E-03	0 00
Carbon disulfide			
Molecular Weight, g/g-mole	76 13	76 13	
Target Catch, µg	0.01	0 01	0.01
Concentration, mg/dscm a	9 94E-04	9.94E-04	0 00
Concentration, ppbvd b	3 14E-01	3 14E-01	0 31
Emission Rate, lb/hr c	1 28E-06	1.28E-06	0.00
Emission Rate, Ib/1000 lb fuel	2.54E-04	6.40E-04	0.00

 $^{^{\}rm a}$ $\,$ $\dot{}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

Parts per billion by volume.

c Pounds per hour

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	0020 1 (96)	0020 2 (ME2)	Average
	0030-1 (-86)	0030-2 (MF2)	Average
arbon tetrachloride			
Molecular Weight, g/g-mole	153 84	153.84	
Target Catch, µg	0.01	0.01	00
Concentration, mg/dscm a	9 94E-04	9 94E-04	00
Concentration, ppbvd b	1 55E-01	1 55E-01	0.1
Emission Rate, lb/hr c	1.28E-06	1 28E-06	0 0
Emission Rate, lb/1000 lb fuel	2 54E-04	6.40E-04	00
hlorobenzene			
Molecular Weight, g/g-mole	112 56	112.56	
Target Catch, µg	0.01	0.01	0.0
Concentration, mg/dscm a	1 39E-03	1 39E-03	00
Concentration, ppbvd b	2 97E-01	2 97E-01	03
Emission Rate, Ib/hr c	1 79E-06	1.79E-06	0.0
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.0
hlorodibromomethane			
Molecular Weight, g/g-mole	208.28	208.28	
Target Catch, µg	0 01	0 01	0 0
Concentration, mg/dscm	1 39E-03	1 39E-03	00
Concentration, ppbvd b	1.61E-01	1 61E-01	01
Emission Rate, lb/hr c	1 79E-06	1 79E-06	00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	00
hloroethane			
Molecular Weight, g/g-mole	65 51	65 51	
Target Catch, µg	0 01	0 01	00
Concentration, mg/dscm *	1 39E-03	1 39E-03	. 00
Concentration, ppbvd b	5.11E-01	5.11E-01	0.5
Emission Rate, Ib/hr c	1 79E-06	1 79E-06	0.0
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0 0
hioroform			
Molecular Weight, g/g-mole	119.39	119 39	
Target Catch, µg	0 01	0 01	00
Concentration, mg/dscm *	1 39E-03	1.39E-03	00
Concentration, ppbvd b	2 80E-01	2 80E-01	0 2
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 (
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.0

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

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	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
Chloromethane			
Molecular Weight, g/g-mole	50.49	50.49	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	9 94E-04	9 94E-04	0 00
Concentration, ppbvd b	4 74E-01	4 74E-01	0 47
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0.00
Emission Rate, lb/1000 lb fuel	2 54E-04	6.40E-04	0.00
1,1-Dichloroethane			
Molecular Weight, g/g-mole	98 96	98.96	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	1.39E-03	1 39E-03	0.00
Concentration, ppbvd b	3 38E-01	3 38E-01	0.34
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00
1,2-Dichloroethane			
Molecular Weight, g/g-mole	98.96	98 96	
Target Catch, µg	0.01	0 01	0 01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0.00
Concentration, ppbvd b	3.38E-01	3.38E-01	0 34
Emission Rate, lb/hr c	1 79E-06	1.79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0.00
1,1-Dichloroethene			
Molecular Weight, g/g-mole	96 94	96.94	
Target Catch, µg	0 01	0.01	0 01
Concentration, mg/dscm *	1.39E-03	1.39E-03	0 00
Concentration, ppbvd b	3 45E-01	3 45E-01	0.35
Emission Rate, lb/hr °	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00

Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.
 Parts per billion by volume.

^c Pounds per hour

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	0030-1 (-86)	0030-2 (MF2)	Average
cis-1,2-Dichloroethene			
Molecular Weight, g/g-mole	96.94	96.94	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm 8	1.39E-03	1.39E-03	0 00
Concentration, ppbvd b	3 45E-01	3 45E-01	0.35
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00
trans-1,2-Dichloroethene			
Molecular Weight, g/g-mole	96.94	96.94	
Target Catch, µg	0 01	0.01	0 01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 45E-01	3 45E-01	0.35
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00
1,2-Dichloropropane			
Molecular Weight, g/g-mole	112 99	112 99	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm a	1 39E-03	1.39E-03	0 00
Concentration, ppbvd b	2 96E-01	2 96E-01	0 30
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour.

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	0030-1 (-86)	0030-2 (MF2)	Average
cis-1,3-Dichloropropene			
Molecular Weight, g/g-mole	110.97	110 97	
Target Catch, µg	0 01	0.01	0.01
Concentration, mg/dscm *	1.39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 02E-01	3 02E-01	0 30
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00
trans-1,3-Dichloropropene			
Molecular Weight, g/g-mole	110.97	110 97	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	1 39E-03	1.39E-03	0.00
Concentration, ppbvd ^b	3 02E-01	3 02E-01	0 30
Emission Rate, lb/hr ^c	1.79E-06	1.79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00
Ethylbenzene			
Molecular Weight, g/g-mole	106.17	106.17	
Target Catch, µg	0.44	0.52	0.48
Concentration, mg/dscm a	4 37E-02	5.17E-02	0.05
Concentration, ppbvd b	9.91E+00	1 17E+01	10.81
Emission Rate, lb/hr c	5.64E-05	6 66E-05	0.00
Emission Rate, lb/1000 lb fuel	1 12E-02	3.33E-02	0 02
2-Hexanone			
Molecular Weight, g/g-mole	100.16	100 16	
Target Catch, µg	0 05	0.05	0 05
Concentration, mg/dscm *	4 97E-03	4 97E-03	0.00
Concentration, ppbvd b	1 19E+00	1 19E+00	1 19
Emission Rate, lb/hr c	6 41E-06	6.41E-06	0 00
Emission Rate, lb/1000 lb fuel	1.27E-03	3.20E-03	0.00

 $[^]a$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm .

b Parts per billion by volume.

c Pounds per hour

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	<u>0030-1 (-86)</u>	<u>0030-2 (MF2)</u>	<u>Average</u>
Methylene chloride			
Molecular Weight, g/g-mole	84.93	84.93	
Target Catch, µg	0 40	0 55	0 48
Concentration, mg/dscm *	4 02E-02	5 47E-02	0.05
Concentration, ppbvd b	1.14E+01	1.55E+01	13 43
Emission Rate, 1b/hr c	5.18E-05	7.05E-05	0 00
Emission Rate, lb/1000 lb fuel	1.03E-02	3.52E-02	0.02
4-Methyl-2-pentanone			
Molecular Weight, g/g-mole	100.16	100 16	
Target Catch, µg	0 05	0 05	0 05
Concentration, mg/dscm a	4 97E-03	4.97E-03	0.00
Concentration, ppbvd b	1 19E+00	1 19E+00	1 19
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0.00
Emission Rate, lb/1000 lb fuel	1 27E-03	3.20E-03	0.00
Styrene			
Molecular Weight, g/g-mole	104 15	104 15	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	9 94E-04	9 94E-04	0.00
Concentration, ppbvd b	2 30E-01	2.30E-01	0.23
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0 00
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour.

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	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
1,1,2,2-Tetrachloroethane			
Molecular Weight, g/g-mole	167 85	167.85	
Target Catch, µg	0.01	0 01	0 01
Concentration, mg/dscm *	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	1 99E-01	1.99E-01	0.20
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00
l'etrachioroethene			
Molecular Weight, g/g-mole	165 83	165.83	
Target Catch, µg	0 01	0.01	0.01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0.00
Concentration, ppbvd b	2.02E-01	2 02E-01	0.20
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
oluene			
Molecular Weight, g/g-mole	94.14	94 14	
Target Catch, µg	0 74	1.40	1.07
Concentration, mg/dscm *	7 36E-02	1.39E-01	0 11
Concentration, ppbvd b	1 88E+01	3.56E+01	27 18
Emission Rate, lb/hr c	9.48E-05	1.79E-04	0 00
Emission Rate, lb/1000 lb fuel	1.88E-02	8.96E-02	0.05

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm $^{\rm a}$

b Parts per billion by volume.

c Pounds per hour

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	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
1,1,1-Trichloroethane			
Molecular Weight, g/g-mole	133.40	133 40	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	1 39E-03	1.39E-03	0.00
Concentration, ppbvd b	2 51E-01	2 51E-01	0 25
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
1,1,2-Trichloroethane			
Molecular Weight, g/g-mole	133.40	133.40	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm *	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	2 51E-01	2 51E-01	0 25
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0 00
Trichloroethene			
Molecular Weight, g/g-mole	131 39	131 39	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	2 55E-01	2 55E-01	0.25
Emission Rate, lb/hr c	1.79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00
Trichlorofluoromethane (Freon 11)			
Molecular Weight, g/g-mole	137.37	137.37	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm a	9 94E-04	9 94E-04	0.00
Concentration, ppbvd b	1 74E-01	1 74E-01	0 17
Emission Rate, Ib/hr c	1.28E-06	1 28E-06	0.00
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour

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	030114.0000.002		·
	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
o-Xylene			
Molecular Weight, g/g-mole	106 17	106 17	
Target Catch, µg	0.35	057	0.46
Concentration, mg/dscm a	1.07E-03	1.07E-03	0.00
Concentration, ppbvd ^b	7.88E+00	1.28E+01	10.36
Emission Rate, lb/hr c	4.48E-05	7.30E-05	0.00
Emission Rate, lb/1000 lb fuel	8 90E-03	3 65E-02	0.02
m-Xylene & p-Xylene			
Molecular Weight, g/g-mole	106 17	106 17	
Target Catch, µg	0 84	1.20	1.02
Concentration, mg/dscm a	8.33E-02	1.19E-01	0.10
Concentration, ppbvd b	1 89E+01	2 70E+01	22.95
Emission Rate, lb/hr c	1 07E-04	1.54E-04	0 00
Emission Rate, lb/1000 lb fuel	2 13E-02	7 68E-02	0 05
Vinyl acetate			
Molecular Weight, g/g-mole	86.09	86.09	
Target Catch, µg	0 05	0.05	0.05
Concentration, mg/dscm a	4 97E-03	4 97E-03	0 00
Concentration, ppbvd ^b	1 39E+00	1 39E+00	1 39
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0 00
Emission Rate, 1b/1000 lb fuel	1.27E-03	3.20E-03	0.00

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

^c Pounds per hour.

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POLYNUCLEAR AROMATIC HYDROCARBONS

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
	MEASURED DATA			
P _{static}	Stack Static Pressure, inches H ₂ O	5.22	0.01	2.62
У	Meter Box Correction Factor	1.273	1.273	1.273
P_{bar}	Barometric Pressure, inches Hg	30.65	30.68	30 67
V_{m}	Sample Volume, L ³	11.780	16.150	13.965
Dp ^{1/2}	Average Square Root Dp, (in. H ₂ O) ^{1/2}	1.4267	0.1039	0.7653
$T_{\mathbf{m}}$	Average Meter Temperature, °F	78	101	90
T_{s}	Average Stack Temperature, °F	548	263	406
CO ₂	Carbon Dioxide content, % by volume	5.0	4.2	4 6
O_2	Oxygen content, % by volume	14.7	15.1	14 9
N_2	Nitrogen content, % by volume	80.3	80 7	80 5
C_p	Pitot Tube Coefficient	0.99	0.99	0.99
	Circular Stack? 1=Y,0=N	1	1	
As	Diameter or Dimensions, inches	4.00	4.00	4.00
F	Fuel Flow, Ib/hr	5.04	2.00	
Q	Sample Run Duration, minutes	50	60	55
	CALCULATED DATA			
$V_{m(std)}$	Standard Meter Volume,L3	15.072	19.858	17.465
V _{m(std)}	Standard Meter Volume,ft ³	0.532	0.701	0.617
P _s	Stack Pressure, inches Hg	31.03	30.68	30.86
B_{ws}	Moisture, % by volume	5.1	5.4	5.2
1-B _{ws}	Dry Mole Fraction	0.949	0.946	0.948
M _d	Molecular Weight (d.b.), lb/lb•mole	29.39	29.27	29.33
M_{s}	Molecular Weight (w b), lb/lb-mole	28.81	28.66	28.74
V_{ϵ}	Stack Gas Velocity, ft/s	128.2	8.0	68.1
Α	Stack Area, ft ²	0.1	0.1	0.09
Q_a	Stack Gas Volumetric flow, acfm	672	42	357
Q_s	Stack Gas Volumetric flow, dscfm	344	30	187
Q_s	Stack Gas Volumetric flow, dscmm	10	1	5

	RUN NUMBER	PAH-1 (-86)	PAH-2 (MF2)	_
:	RUN DATE	09/08/03 - 09/10/03	9/10/2003	Average
	RUN TIME	Composite	1325 - 1425	
	EMISSIONS DATA			
	Naphthalene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	128.2	128.2	128.2
	Concentration, lb/dscf	8.27E-09	6.28 <i>E-0</i> 9	0.0
ppmdv	Parts Per Million, Wet Basis	2.48E-02	1.89E-02	2.19E-02
	Parts Per Million, Dry Basis	2.62E-02	1.99E-02	2.31E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97 E- 03	2.08E-02
	2-Methylnaphthalene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	142.2	2.0 142.2	142.2
	Concentration, lb/dscf	8.27 E-09	6.28 E- 09	0.0
ppmdv	Parts Per Million, Dry Basis	2.24E-02		1.97E-02
ppilide	· · · · · · · · · · · · · · · · · · ·	2.36E-02		2.08E-02
	Parts Per Million, Dry Basis	2.30E-02 1.80E-04		
	Emission Rate, lb/hr			9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56 E -02	5.9/E-U3	2.08E-02
	2-Chloronaphthalene			
	Analysis, ug/sample	20	2.0	2.0
	Molecular Weight, MW	162.6	162.6	162.6
	Concentration, lb/dscf	8.27E-09	6.28 E-0 9	0.0
ppmdv	Parts Per Million, Wet Basis	1.96E-02		1.72E-02
	Parts Per Million, Dry Basis	2.06E-02	1.57E-02	1.82E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Acenaphthene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	154.2	154.2	154.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	2.07E-02	1.57E-02	1.82E-02
	Parts Per Million, Dry Basis	2.18 <i>E-</i> 02		1.92E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
,	Emission Rate, Ib/1000 Ib fuel	3.56E-02		2.08E-02
	Acenaphthylene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	152.2	152.2	152.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Wet Basis	2.09E-02	1.59E-02	
Phina	Parts Per Million, Dry Basis	2.09E-02 2.20E-02	1.68E-02	1
	Emission Rate, lb/hr	2.20E-02 1.80E-04	1.06E-02 1.19E-05	
	•			
	Emission Rate, Ib/1000 lb fuel	3.56E-02	5.97 E- 03	2.U6E-U2

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
	Fluorene		TAV	
	Analysis, u g/sample	20	2.0	2.0
	Molecular Weight, MW	166.2	166.2	
	Concentration, lb/dscf	8.27E-09	6.28 <i>E-</i> 09	0.0
ppmdv	Parts Per Million, Dry Basis	1.92E-02	1.45E-02	1.69E-02
	Parts Per Million, Dry Basis	2.02E-02	1.54E-02	1.78E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Phenanthrene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	178.0	178.0	
	Concentration, lb/dscf	8.27E-09	6.28 <i>E-0</i> 9	0.0
ppmdv	Parts Per Million, Dry Basis	1.79E-02		1.57E-02
	Parts Per Million, Dry Basis	1.89E-02	1.44E-02	1.66E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Anthracene			_
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	178.2	178.2	178.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.79E-02	1.36E-02	
	Parts Per Million, Dry Basis	1.88E-02	1.43E-02	
	Emission Rate, lb/hr Emission Rate, lb/1000 lb fuel	1.80E-04 3.56E-02	1.19E-05 5.97 E- 03	
•	Fluoranthene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	202.3	202.3	202.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.57E-02	1.20E-02	1.38E-02
-	Parts Per Million, Dry Basis	1.66E-02	1.26E-02	1.46E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3 56E-02	<i>5 97E-03</i>	2.08E-02
	Pyrene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	202.3	202.3	202.3
	Concentration, lb/dscf	8.27E-09	6.28 <i>E-0</i> 9	0.0
ppmdv	Parts Per Million, Dry Basis	1.57E-02	1.20E-02	
	Parts Per Million, Dry Basis	1.66E-02	1.26E-02	
	Emission Rate, lb/hr	1.80E-04	1.19E-05	
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97 E -03	2.08E-02

	RUN NUMBER	PAH-1 (-86)	PAH-2 (MF2)	
	RUN DATE	09/08/03 - 09/10/03	9/10/2003	Average
	RUN TIME	Composite	1325 - 1425	Average
	Chrysene	Composite	1020 1720	
	Analysis, <i>u</i> g/sample	20	20	2.0
	Molecular Weight, MW	228.3	228.3	228.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1,40E-02		1.23E-02
ppiii	Parts Per Million, Dry Basis	1.47E-02		1.29E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02		2.08E-02
i	Limssion rate, ib/ 1000 ib idei	0.002-02	0.072 00	2.002 0
	Benzo(a)anthracene			
	Analysis, u g/sample	2.0	2.0	2.0
	Molecular Weight, MW	228.3	228.3	228.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.40E-02	1.06E-02	1.23E-02
4 - 4 - 3	Parts Per Million, Dry Basis	1.47E-02		1.29E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02		2.08E-02
•				
	Benzo(b)fluoranthene			
	Analysis, ug/sample	2.0	20	2.0
	Molecular Weight, MW	<i>2</i> 52.3	252.3	252.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.26 <i>E-</i> 02	9.58 E- 03	1.11E-02
	Parts Per Million, Dry Basis	1.33E-02	1.01E-02	1.17E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Dawe (Islandersham)			
	Benzo(k)fluoranthene Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	252.3	252.3	
	Concentration, lb/dscf	8.27 <i>E</i> -09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.26E-02		1.11E-02
ppmav	Parts Per Million, Dry Basis	1.33E-02		1.17E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02		2.08E-02
	Benzo(a)pyrene			
	Analysis, ug/sample	2.0	2.0	
	Molecular Weight, MW	252.3	252.3	
_	Concentration, lb/dscf	8.27E-09	6.28E-09	
ppmdv	Parts Per Million, Dry Basis	1.26E-02		1.11E-02
	Parts Per Million, Dry Basis	1.33E-02		1.17E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3. <i>56E-0</i> 2	5.97E-03	2.08E-02
	•			

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
	Indeno(1,2,3-c,d)pyrene			
	Analysis, ug/sample	2.0	2.0	2.6
	Molecular Weight, MW	276.3	276.3	276.
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.15E-02	8.75E-03	1.01E-0
	Parts Per Million, Dry Basis	1.21E-02	9.25E-03	1.07E-0
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Dibenz(a,h)anthracene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	278. 4	278. 4	278.
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.14E-02	8.68E-03	1.01E-0
	Parts Per Million, Dry Basis	1.21E-02	9.18E-03	1.06E-0
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-0
	Benzo(g,h,i,perylene)			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	276.3	276.3	276.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.15E-02	8.75E-03	1.01E-02
	Parts Per Million, Dry Basis	1.21E-02	9.25E-03	1.07E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3 56E-02	5.97E-03	2.08E-02

Run 5515-1 and 5515-2 had a Rpt. Limit of 2.0; if ND result is shown in italics.



Summary of Stack Gas Parameters and Test Results 030174.006.0002

Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

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	RUN NUMBER RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 9/10/2003 1325 - 1425	Average
	MEASURED DATA			
P _{static}	Stack Static Pressure, inches H ₂ O	5.22	0.01	2 62
У	Meter Box Correction Factor	1.003	1 003	1 003
P _{bar}	Barometric Pressure, inches Hg	30 65	30 6 8	30 67
V _m	Sample Volume, ft ³	34 396	29 420	31 908
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 4267	0.1039	0 7653
DH	Avg Meter Orifice Pressure, in H ₂ O	1 85	0.63	1.24
T _m	Average Meter Temperature, °F	77	99	88
T _s	Average Stack Temperature, °F	548	263	406
V _{ic}	Condensate Collected, ml	46 7	34 5	40.6
CO₂	Carbon Dioxide content, % by volume	50	42	46
O ₂	Oxygen content, % by volume	14 7	15 1	14 9
N ₂	Nitrogen content, % by volume	80.3	80 7	80 5
C _p	Pitot Tube Coefficient	0 99	0 99	0 99
-р	Circular Stack? 1=Y.0=N	1	1	
As	Diameter or Dimensions, inches	4.00	4.00	4 00
F	Fuel Flow, lb/hr	5.04	2.00	
Q	Sample Run Duration, minutes	50	60	5 5
D _n	Nozzle Diameter, inches	0 193	0 500	0 347
	CALCULATED DATA	•		
A_n	Nozzle Area, ft ²	0 000203	0 001363	0 000783
V _{m(std)}	Standard Meter Volume, ft ³	34.909	28 627	31 768
V _{m(std)}	Standard Meter Volume, m°	0 989	0 811	0.900
$\mathbf{Q}_{\mathbf{m}}$	Average Sampling Rate, dscfm	0 698	0.477	0 588
Ps	Stack Pressure, inches Hg	31 03	30 68	30 86
B _{ws}	Moisture, % by volume	59	54	5.6
B _{ws(sat)}	Moisture (at saturation), % by volume	7086.4	248 8	3667 6
V_{wstd}	Standard Water Vapor Volume, ft°	2.198	1 624	1 911
1-B _{ws}	Dry Mole Fraction	0 941	0 946	0 944
M_d	Molecular Weight (d b), lb/lb•mole	29 39	29.27	29 33
M _s	Molecular Weight (w.b.), lb/lb•mole	28 71	28 67	28 69
٧s	Stack Gas Velocity, ft/s	128 4	80	68.2
Α -	Stack Area, ft ²	0.1	0.1	0.09
Q_a	Stack Gas Volumetric flow, acfm	672	42	357
$\mathbf{Q}_{\!\mathbf{s}}$	Stack Gas Volumetric flow, dscfm	344	30	187
Q_s	Stack Gas Volumetric flow, dscmm	10	1	5
ı	Isokinetic Sampling Ratio, %	87.3	103.3	95.3

Summary of Stack Gas Parameters and Test Results 030174.006.0002

Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

Page 2 of 3

	RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 09/10/03 1325 - 1425	Average
	EMISSIONS DATA			
HCHO	Formaldehyde			
	Target Catch, µg	800	3800	2300.0
	Concentration, µg/dscm	809.31	4687.75	2748 53
	Emission Rate, lb/hr	1 04E-03	5 18E-04	7.79E-04
	Emission Rate, lb/1000 lb fuel	2 06E-01	2 59E-01	2 33E-01
СНзСНО	<u>Acetaldehyde</u>			
	Target Catch, µg	750	1200	975.0
	Concentration, µg/dscm	758.72	1480.34	1119 53
	Emission Rate, lb/hr	9.74E-04	1 64E-04	5 69E-04
	Emission Rate, lb/1000 lb fuel	1 93E-01	8 18E-02	1.37E-01
CH2CHCHO	<u>Acrolein</u>			
	Target Catch, µg	26	560	293 00
	Concentration, µg/dscm	26.30	690.83	358 56
	Emission Rate, lb/hr	3.38E-05	7 64E-05	5 51E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	3.82E-02	2.24E-02
CH₃CH₂CH₂OH	<u>Propanal</u>			
	Target Catch, µg	26	240	133 0
	Concentration, µg/dscm	26 3	296.1	161.2
	Emission Rate, lb/hr	3.38E-05	3 27E-05	3 33E-05
	Emission Rate, lb/1000 lb fuel	6 70E-03	1 64E-02	1 15E-02
СН₃СНСНСНО	Crotonaldehyde			
	Target Catch, µg	90	260	175 00
	Concentration, µg/dscm	91.05	320.74	205.89
	Emission Rate, lb/hr	1 17E-04	3 55E-05	7 62E-05
	Emission Rate, lb/1000 lb fuel	2 32E-02	1 77E-02	2 05E-02
CH3COC5H11	Methyl Ethyl Ketone/Butyraldehydes			
	Target Catch, µg	26	260	143 0
	Concentration, µg/dscm	26 3	320.7	173.5
	Emission Rate, lb/hr	3.38 <i>E-05</i>	3 55E-05	3 46E-05
	Emission Rate, lb/1000 lb fuel	6 70E-03	1.77E-02	1.22E-02
C ₆ H ₅ CHO	<u>Benzaldehyde</u>		ı.	
3	Target Catch, µg	26	220	123 0
	Concentration, µg/dscm	26.3	271.4	148.8
	Emission Rate, lb/hr	3 38 <i>E-05</i>	3 00E-05	3 19E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	1 50E-02	1 08E-02
CH ₃) ₂ CHCH ₂ CH6	Clsopentanal			
0,2	Target Catch, µg	26	110	680
	Concentration, µg/dscm	26.3	135.7	81.0
	Emission Rate, lb/hr	3 38E-05	1 50E-05	2 44E-05
	Emission Rate, lb/1000 lb fuel	6 70E-03	7 50E-03	7 10E-03

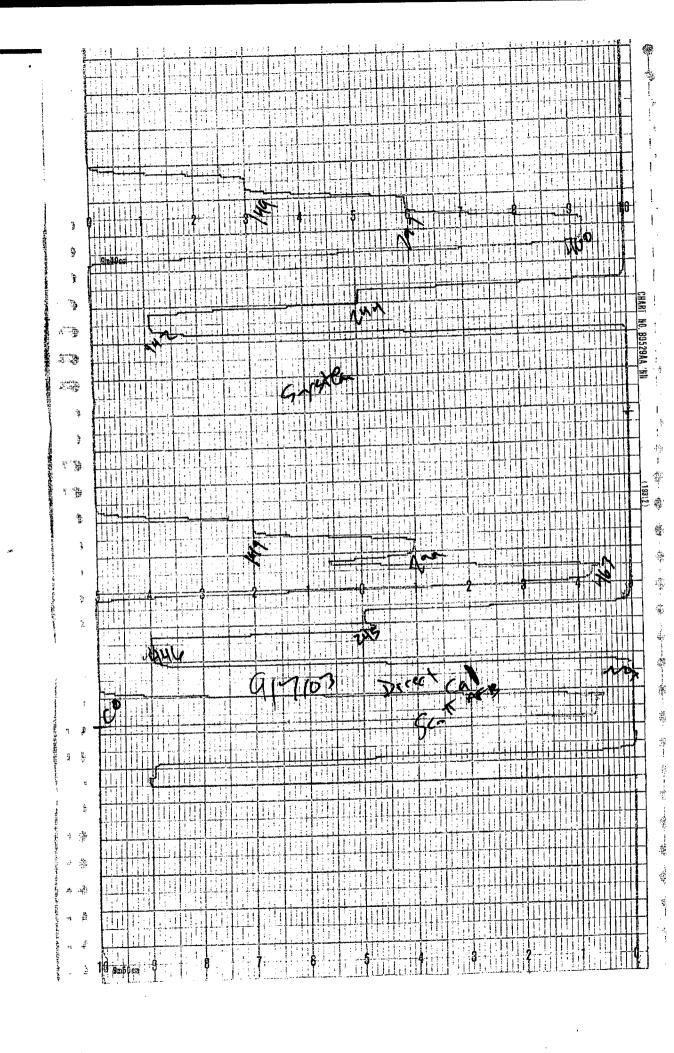
Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

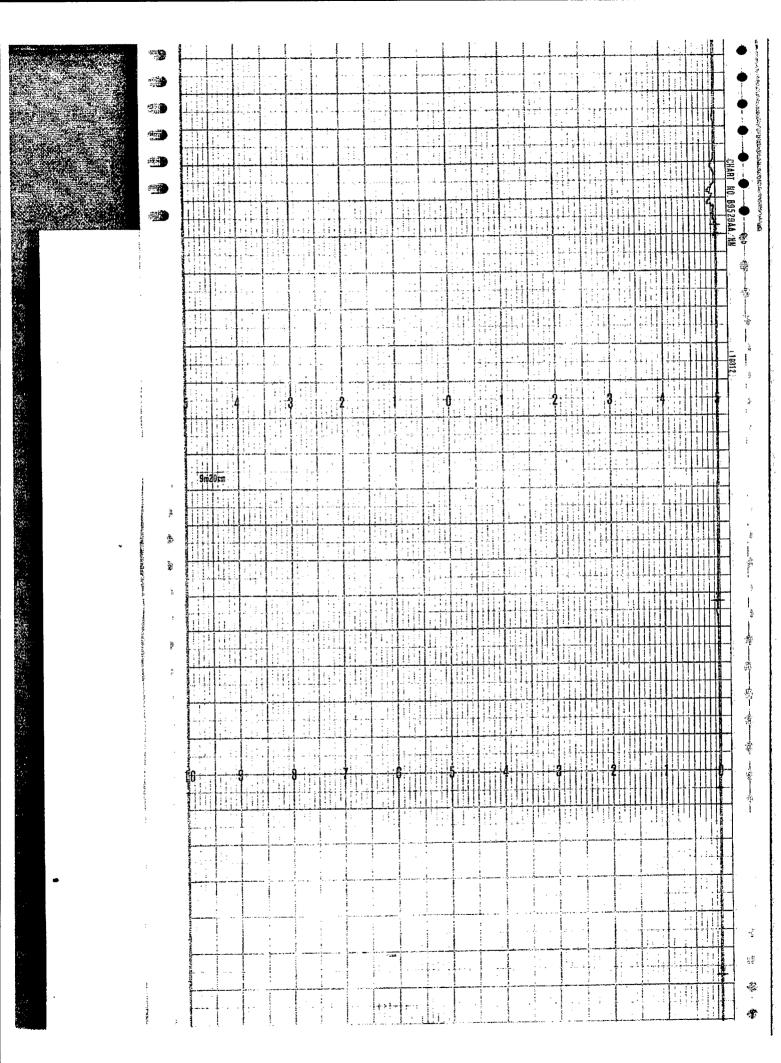
Page 3 of 3

	RUN NUMBER RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 09/10/03 1325 - 1425	Average
	EMISSIONS DATA - Continued			,
CH₃(CH₂)₃CHO	Pentanal			
	Target Catch, µg	26	110	68.0
	Concentration, µg/dscm	26.3	13 5.7	81 0
	Emission Rate, lb/hr	3.38E-05	1.50E-05	2.44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7.50E-03	7 10E-03
C ₆ H₄CH₃CHO	o-Tolualdehyde			
	Target Catch, µg	26	110	68.0
	Concentration, µg/dscm	26.3	<i>135</i> .7	81 0
	Emission Rate, lb/hr	3.38E-05	1 50 E -05	2 44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7 50E-03	7 10E-03
	m.p-Tolualdehyde			
	Target Catch, µg	26	110	68.000
	Concentration, µg/dscm	26 3	135.7	81.000
	Emission Rate, lb/hr	3.38E-05	1.50E-05	2.44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7 50E-03	7 10E- 03
CH₃(CH₂)₄CHO	<u>Hexanal</u>			
	Target Catch, µg	26	110	68
	Concentration, µg/dscm	26.3	135.7	81 0
	Emission Rate, lb/hr	3.38E-05	150E-05	2.44E-05
	Emission Rate, lb/1000 ib fuel	6.70E-03	7.50E-03	7.10E-03

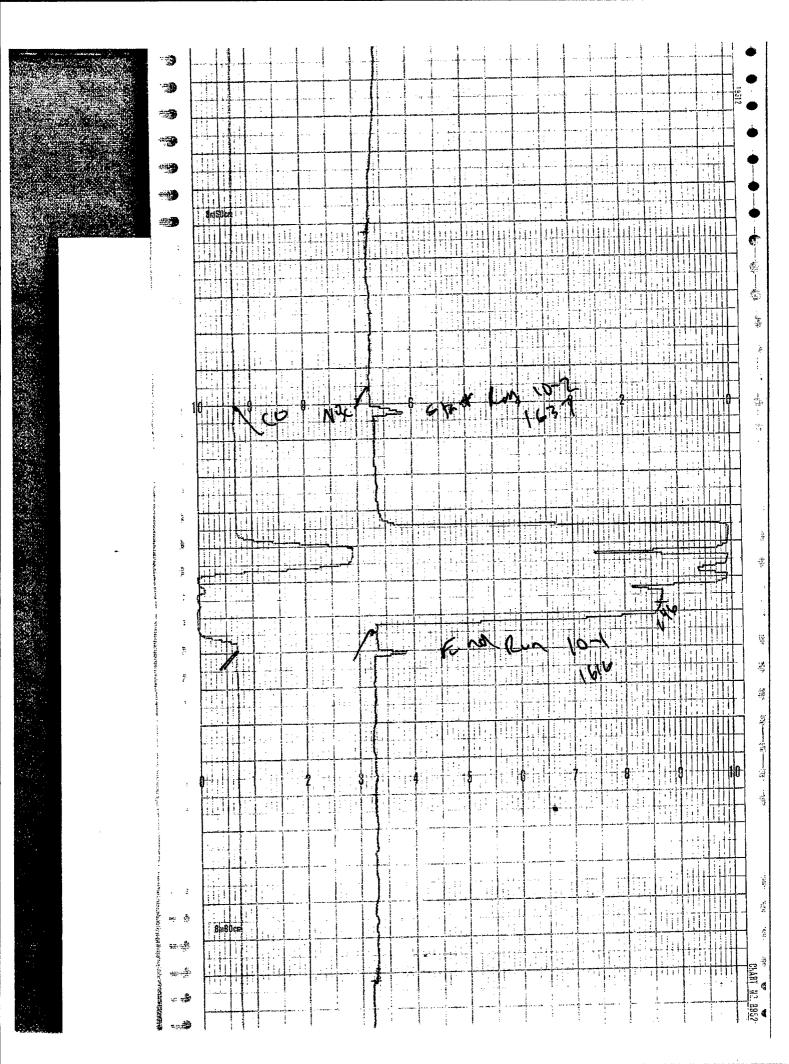
Run 0011-1 had a Rpt. Limit of 26.0; if ND result is shown in italics. Formaldehyde was present in trip blank; Crotonaldehyde may be biased due to matrix Interference Run 0011-2 had a Rpt. Limit of 110; If ND result is shown in italics. Formaldehyde was present in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde may be biased due to matrix interference results in trip blank; Benzaldehyde results in trip blank; Benzaldehyde results in trip blank; Ben

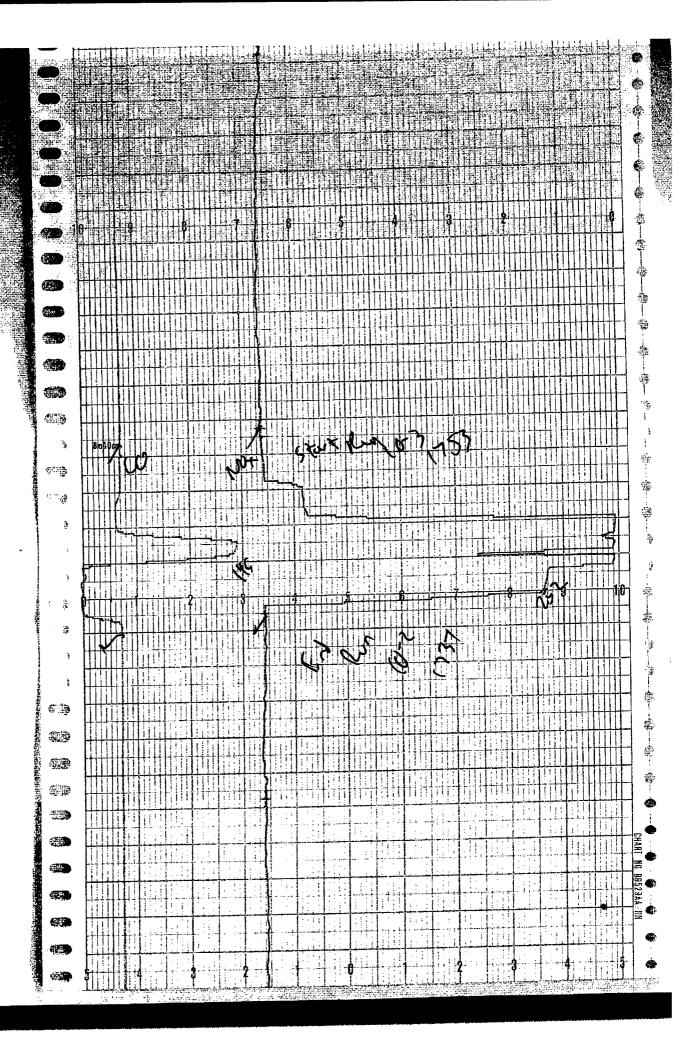
APPENDIX B FIELD DATA

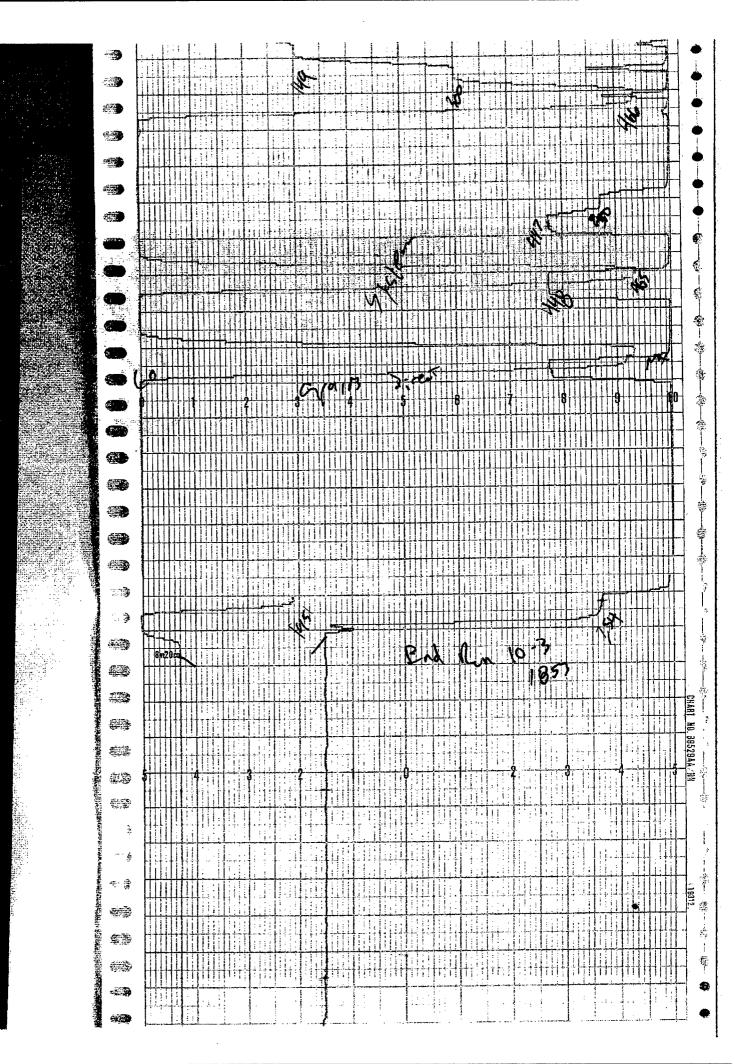


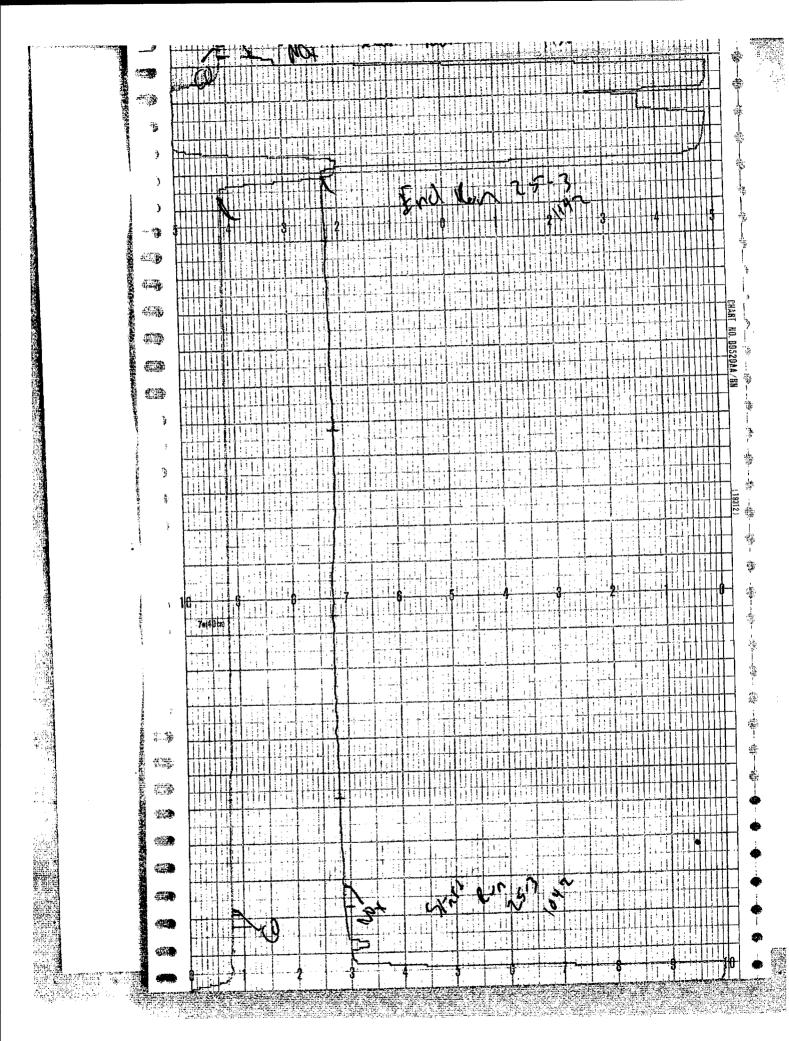


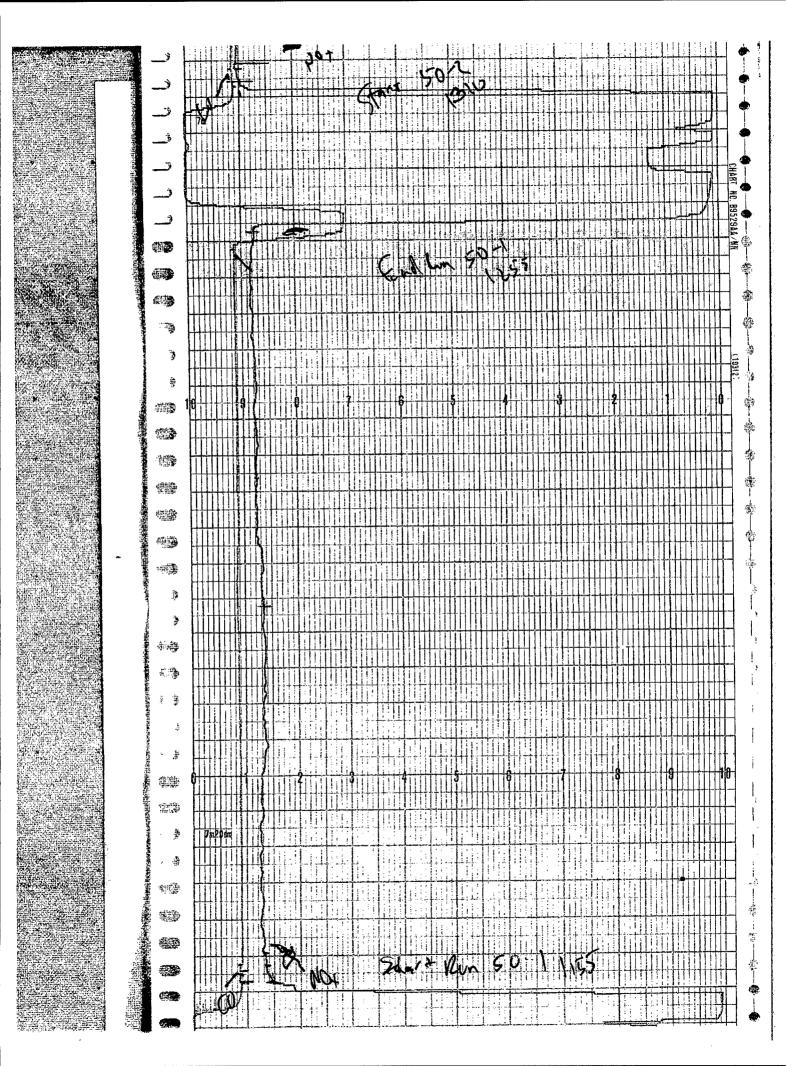
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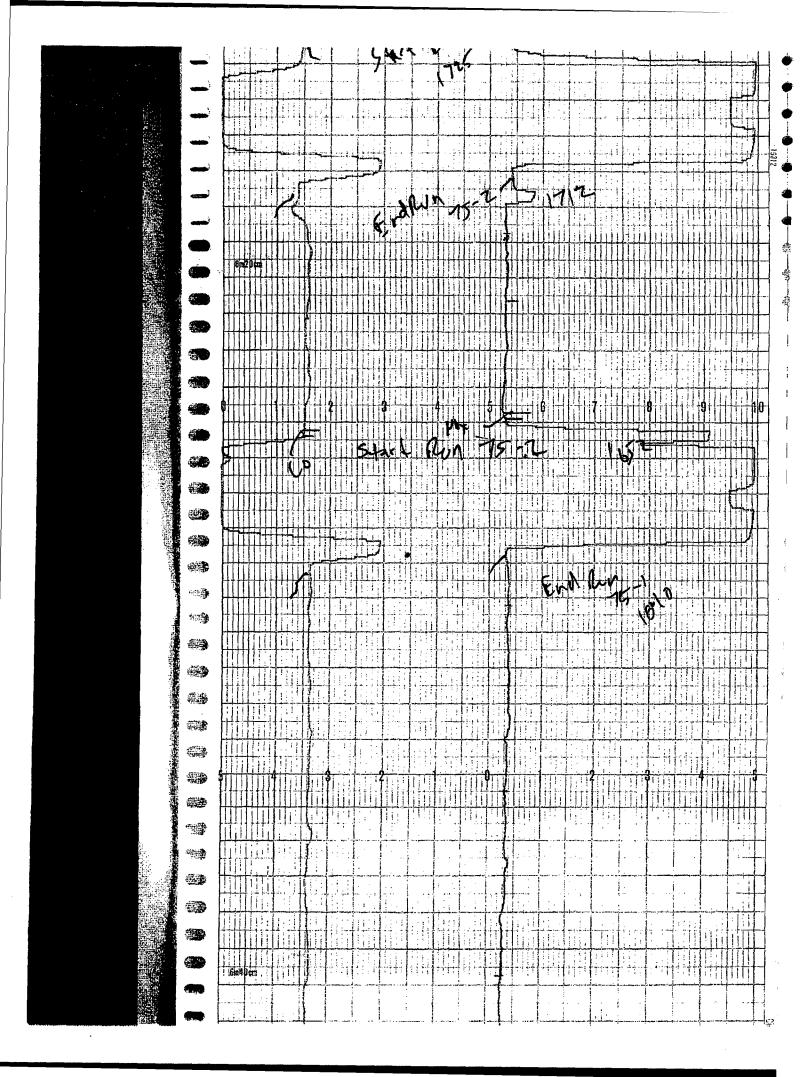


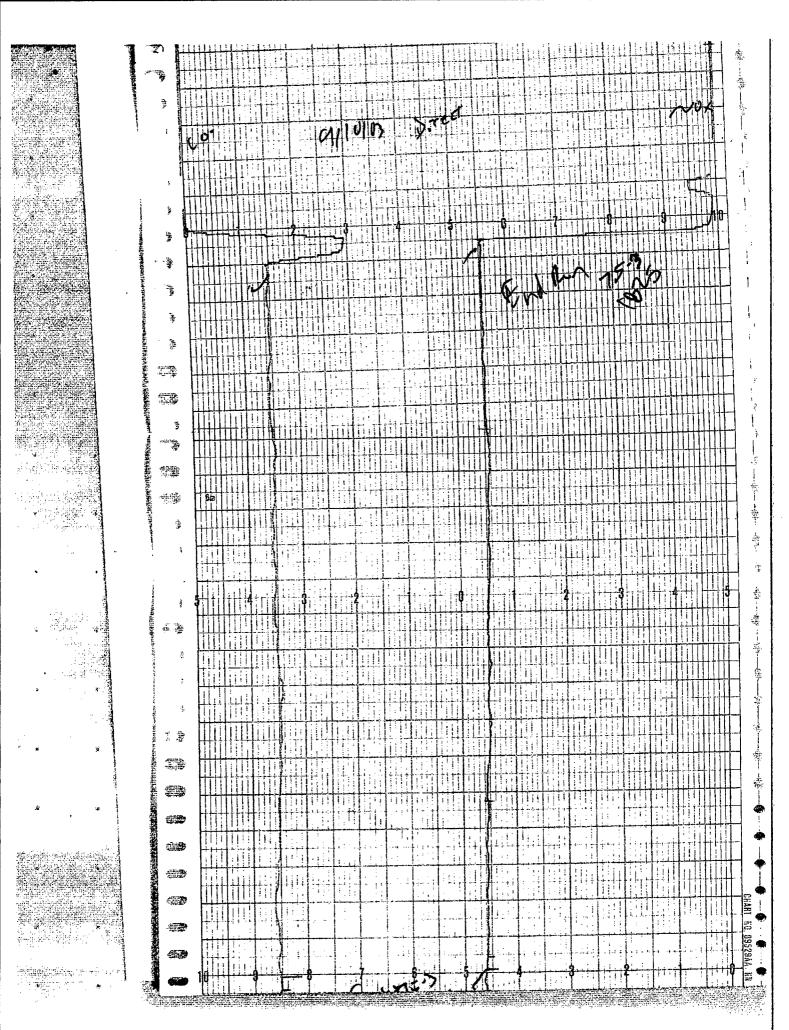


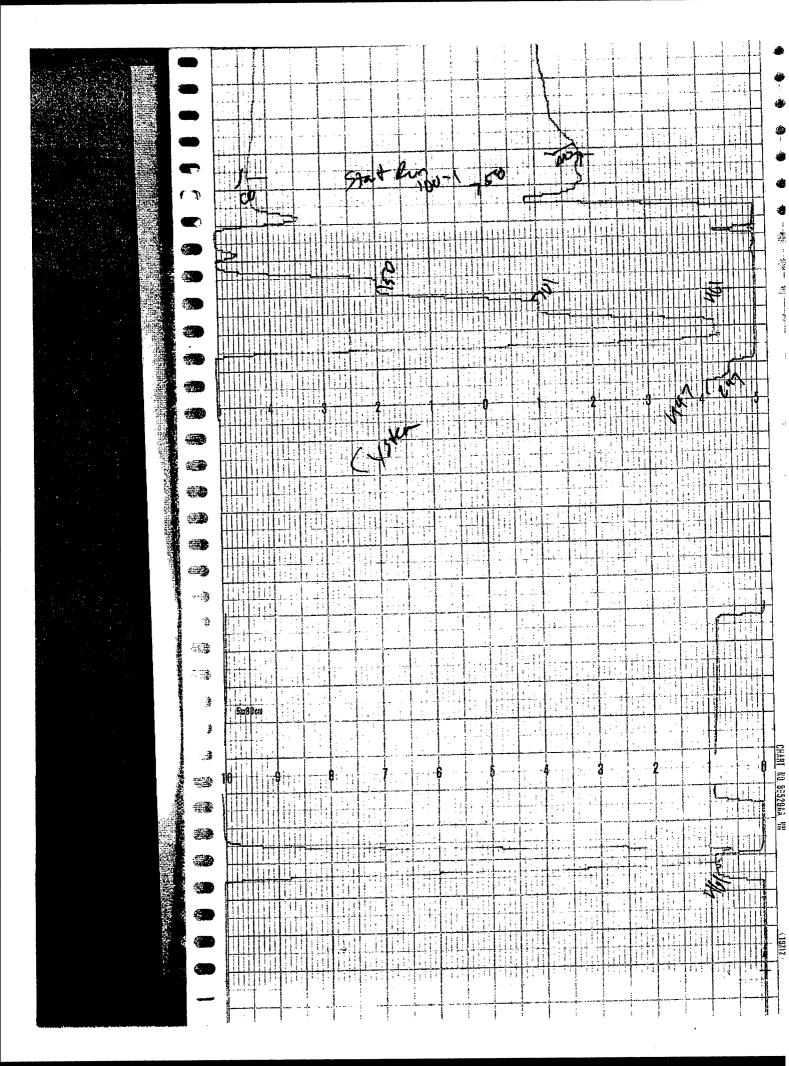


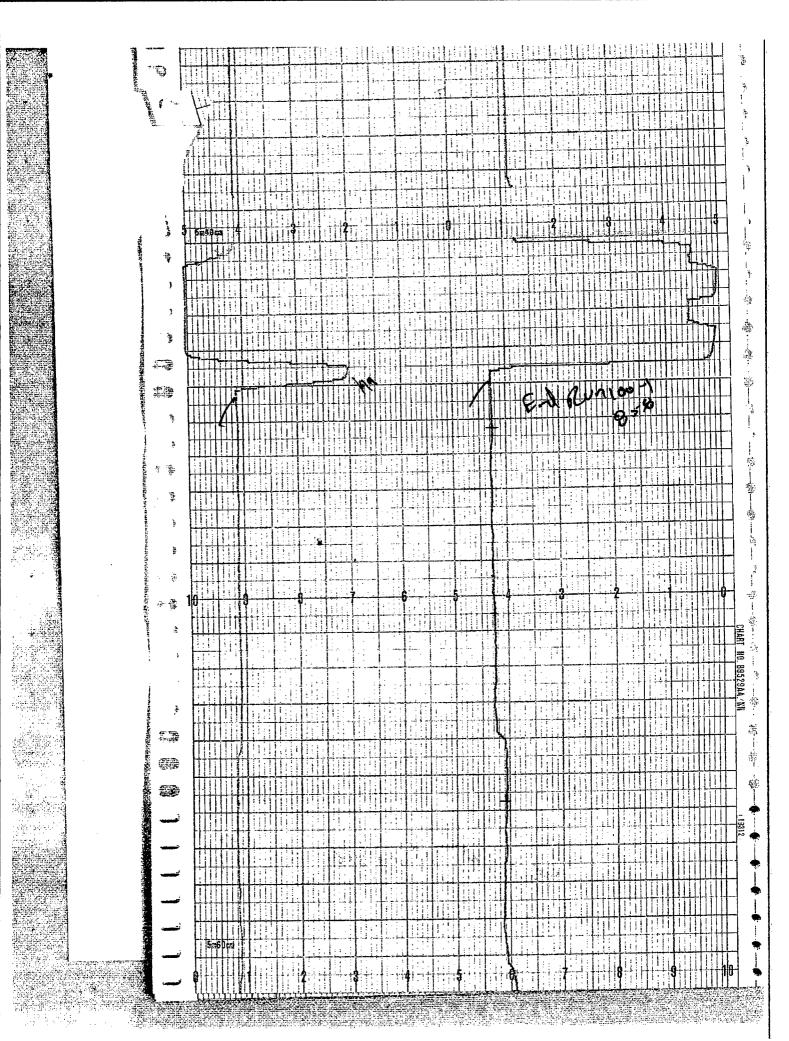


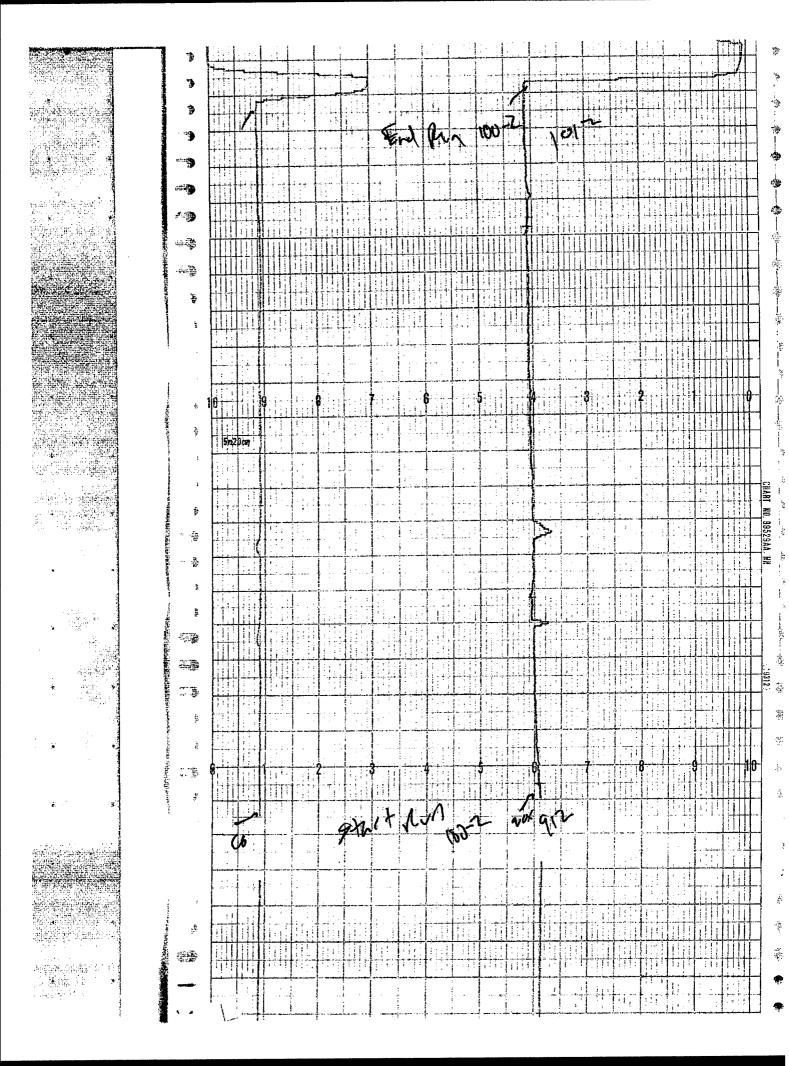




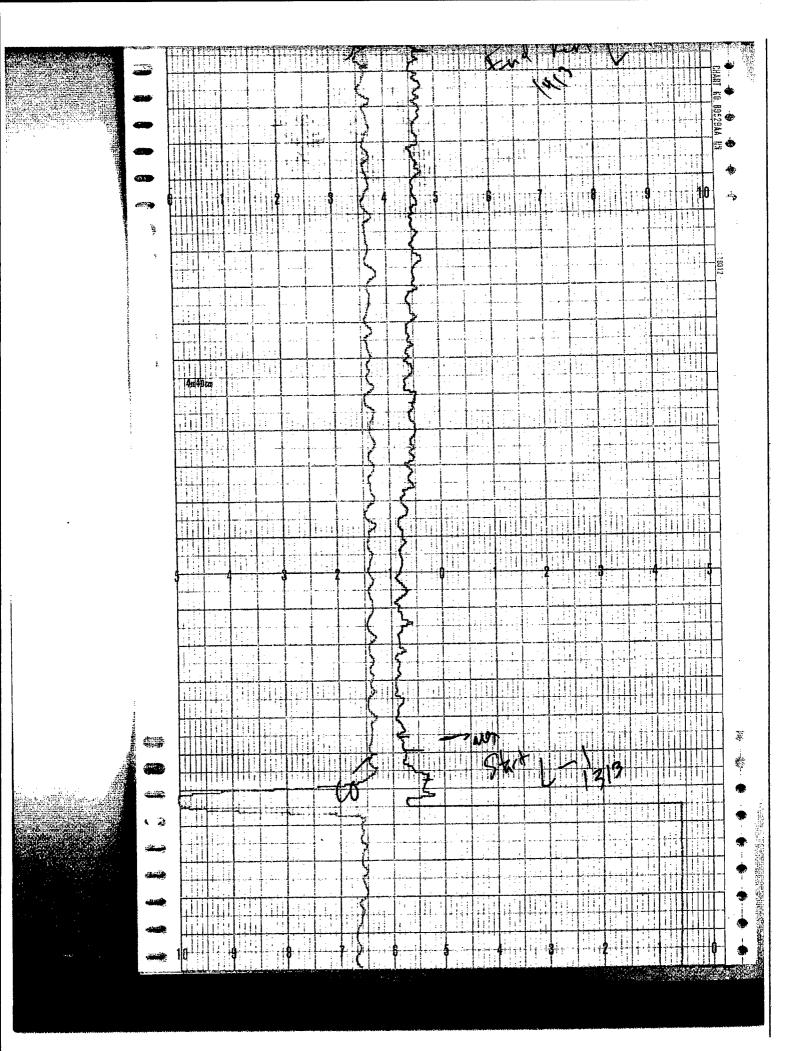


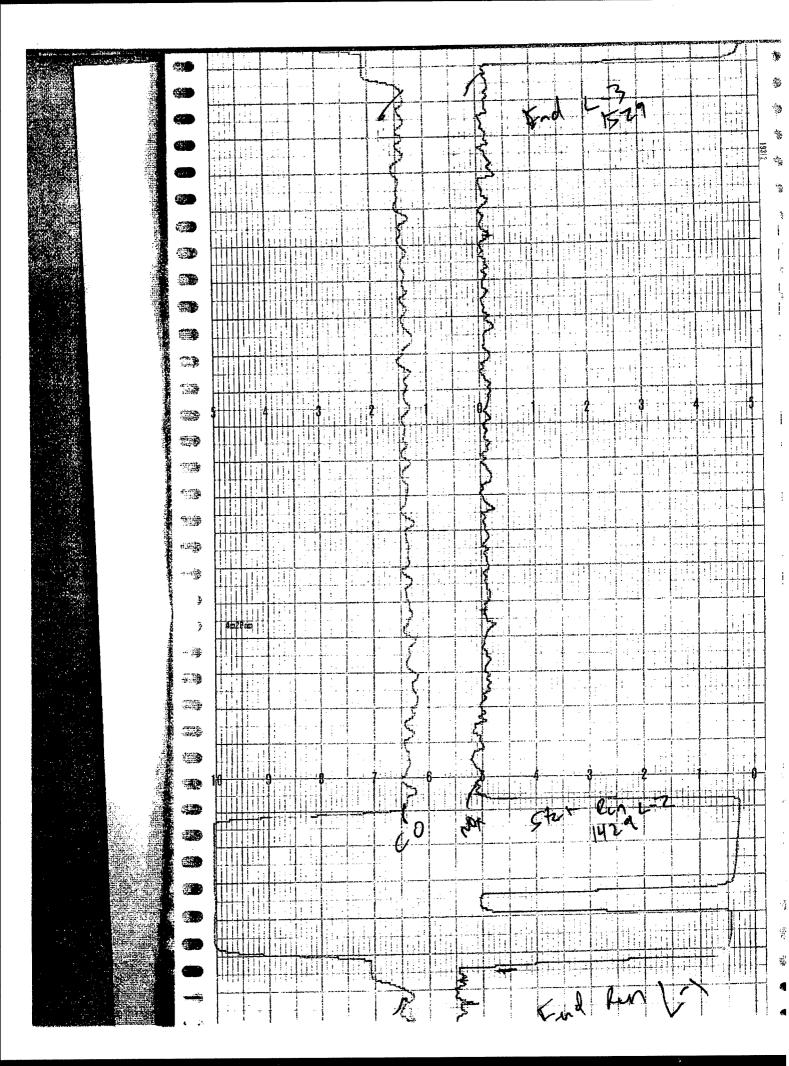


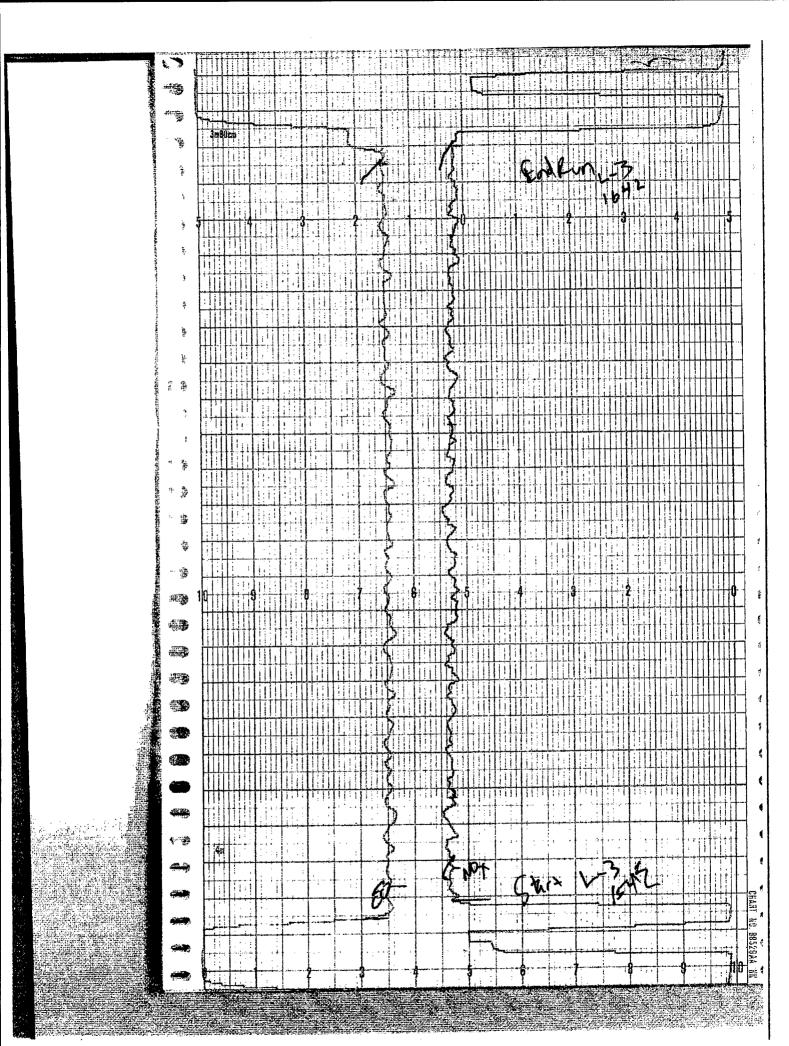


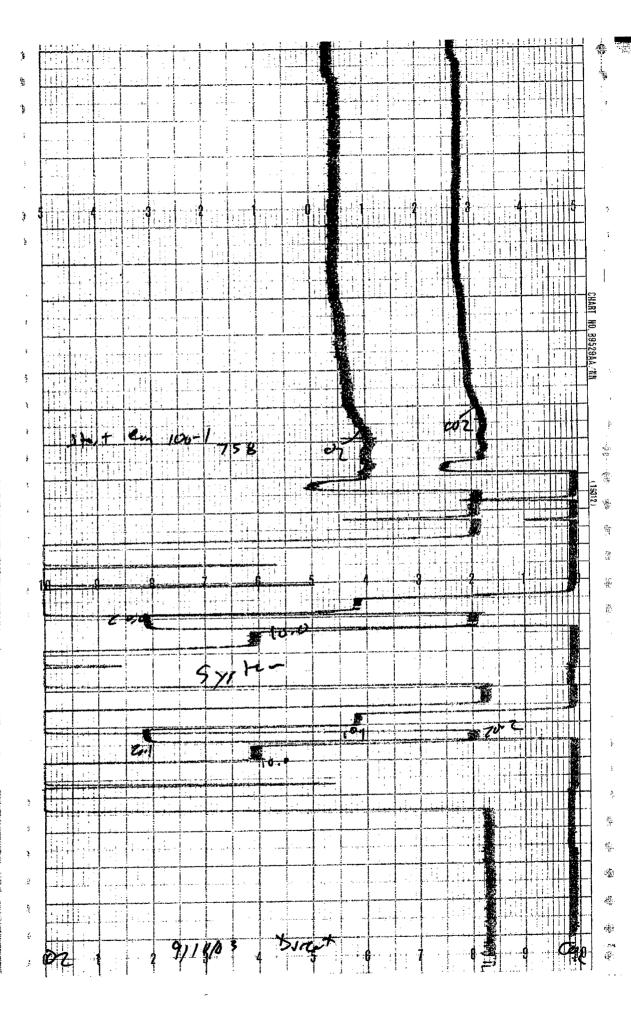


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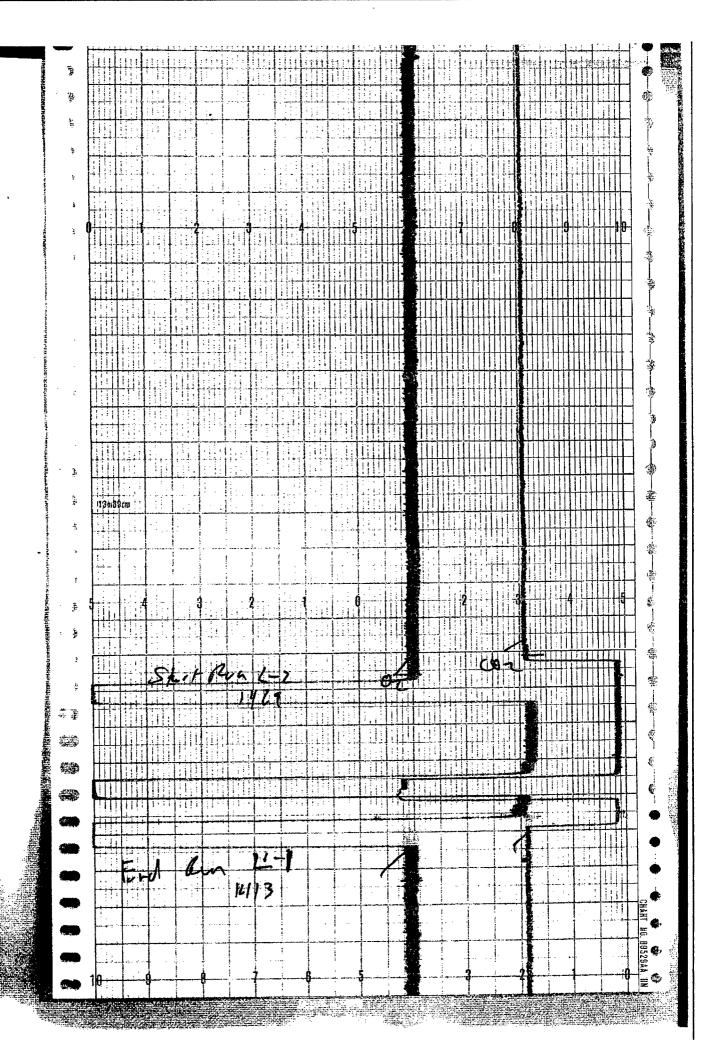
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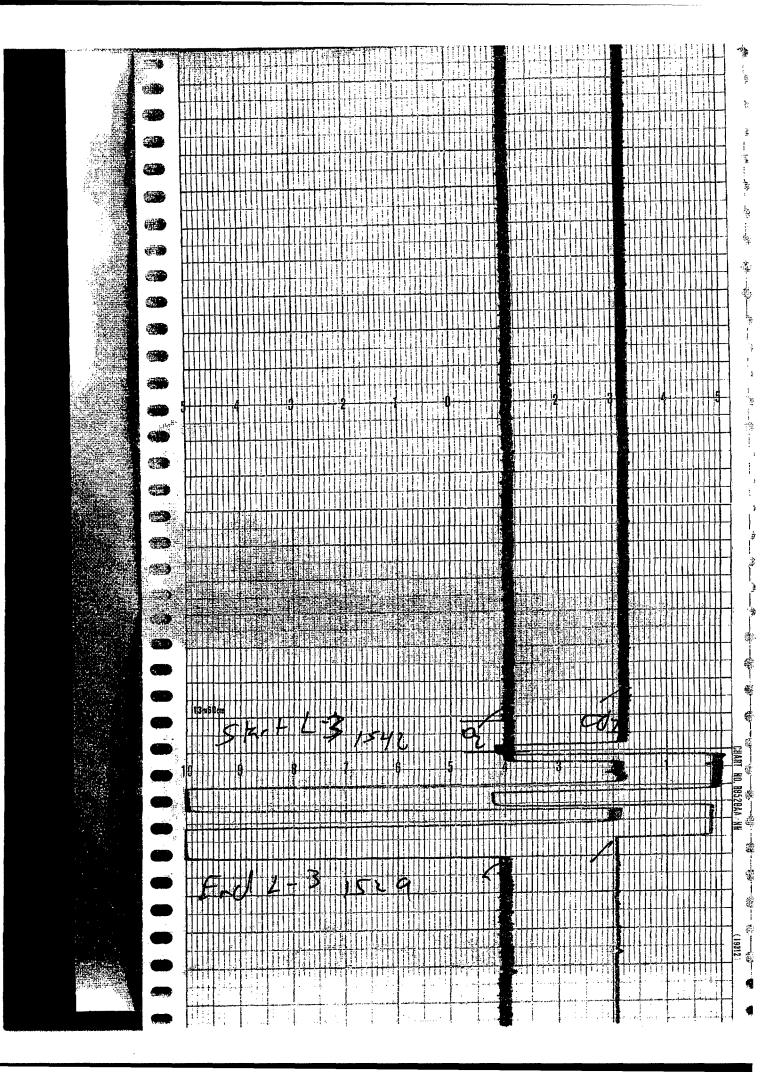
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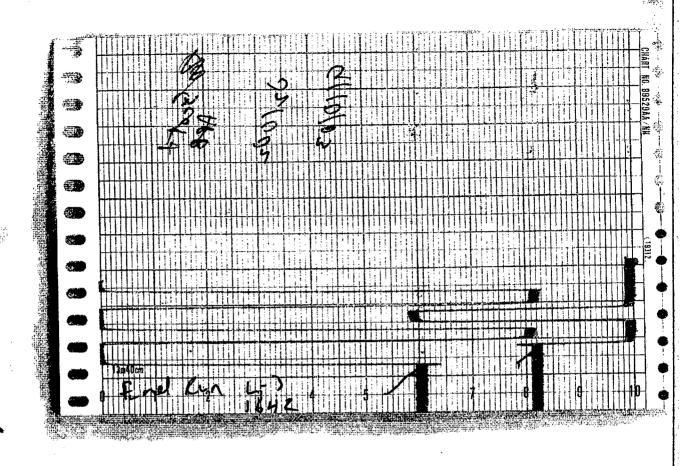
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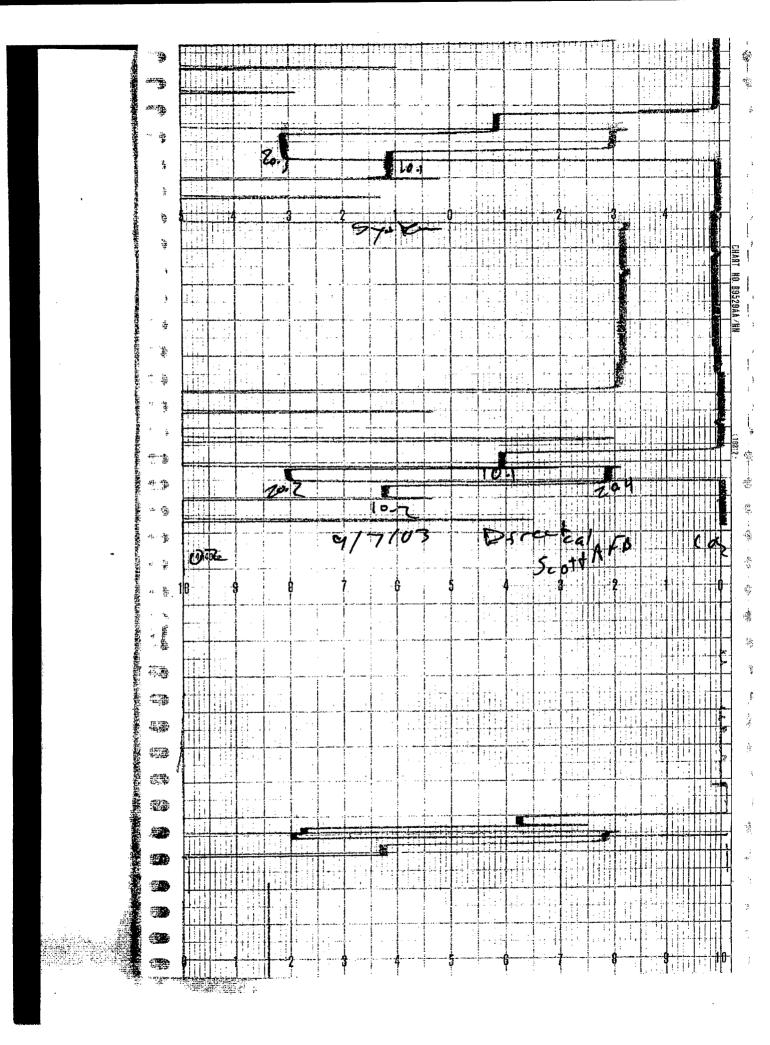
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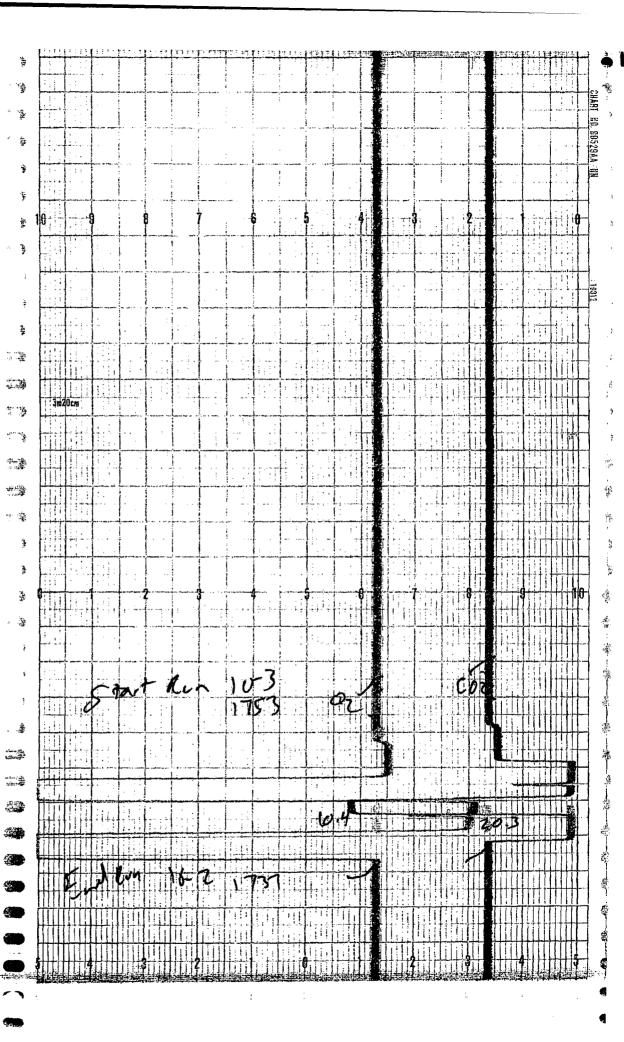
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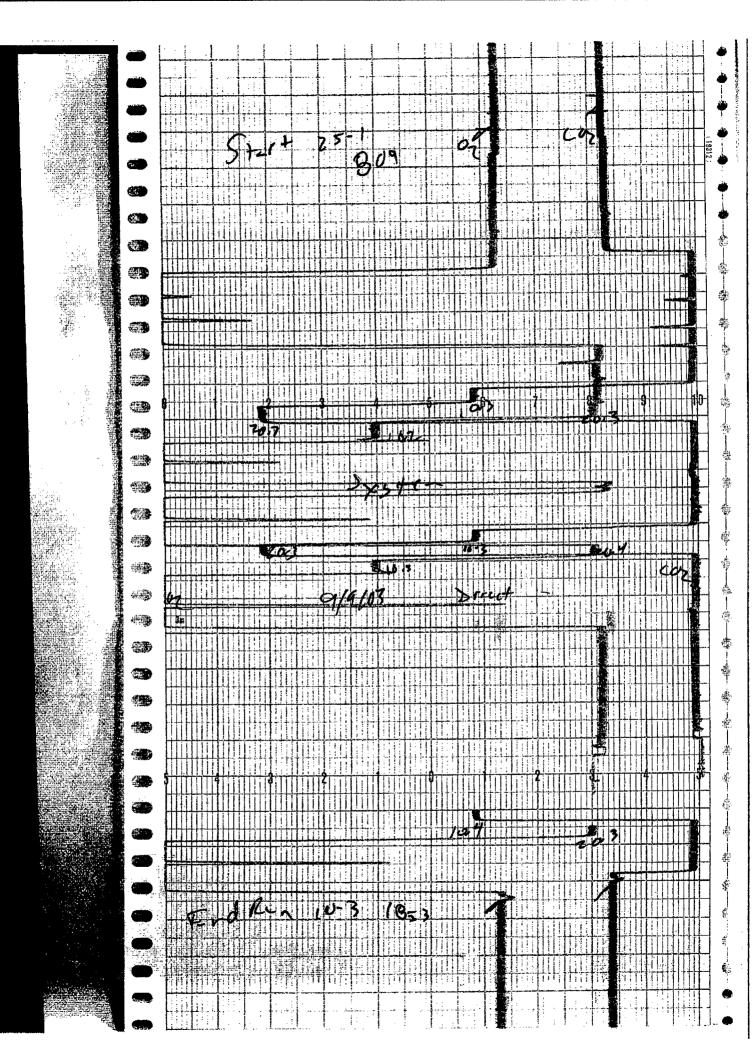
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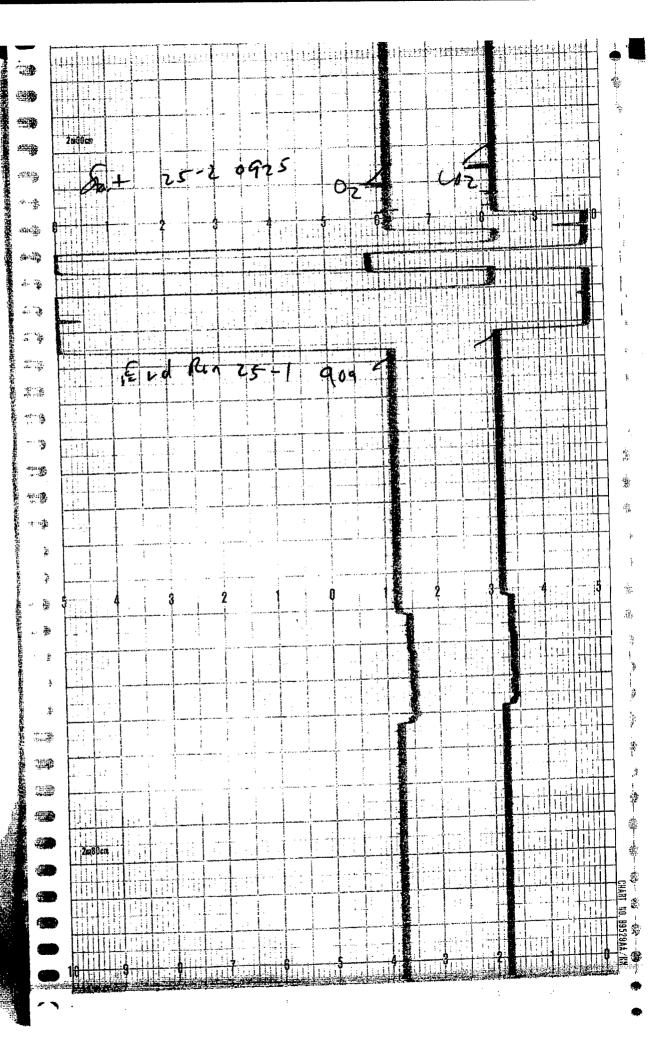
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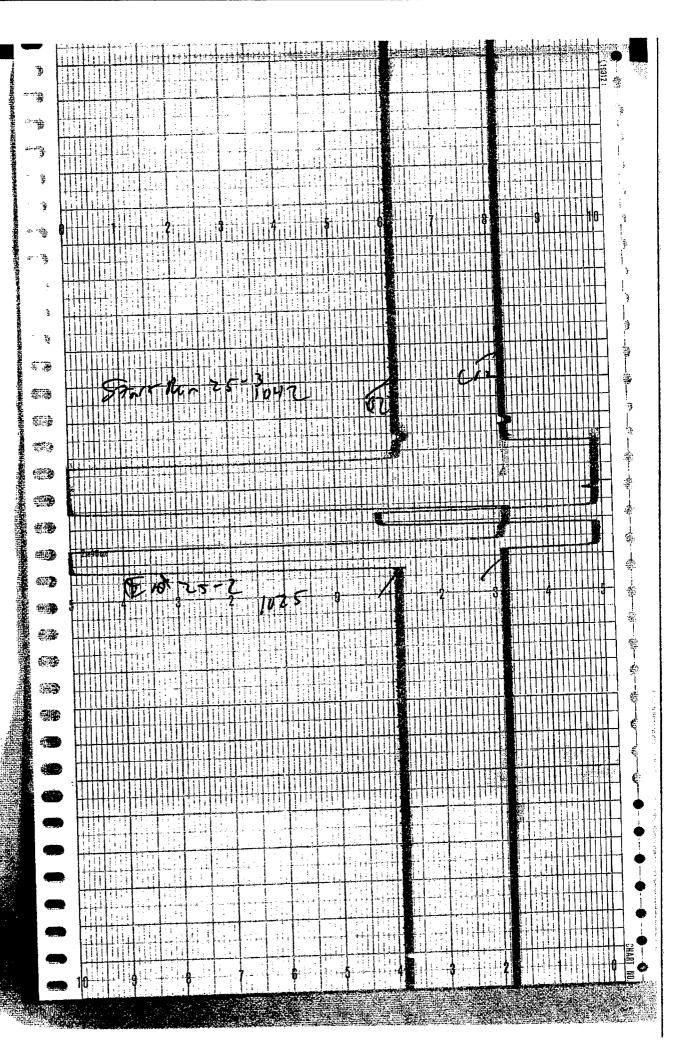
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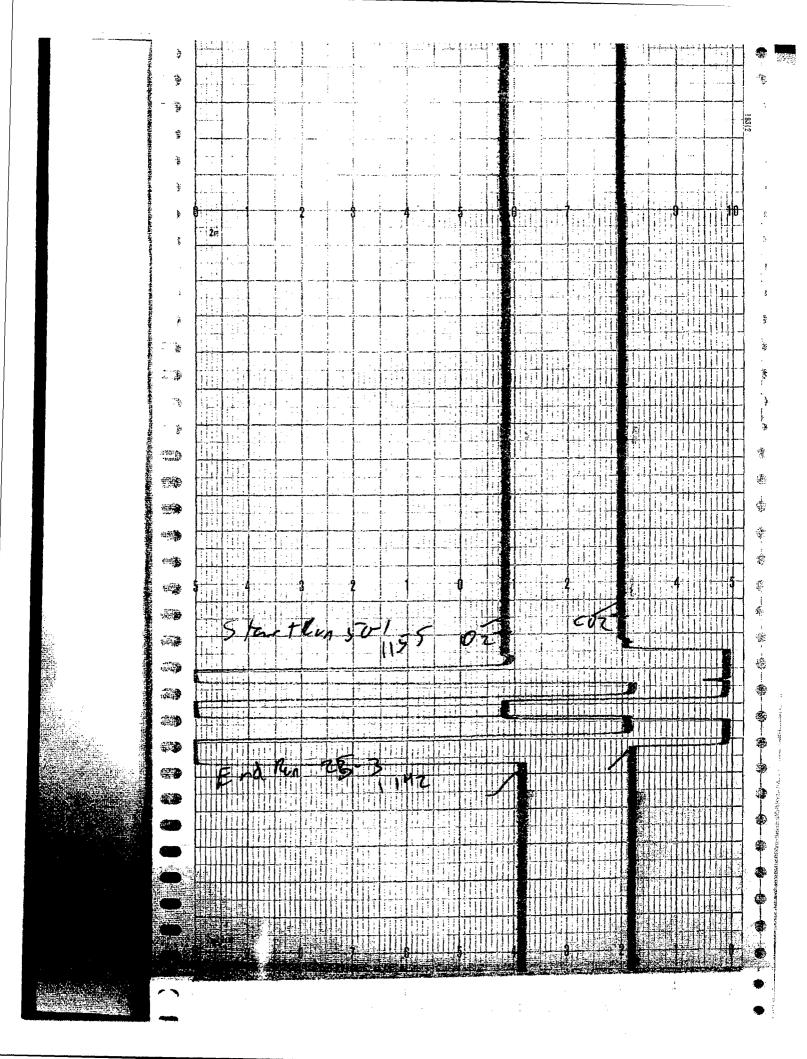
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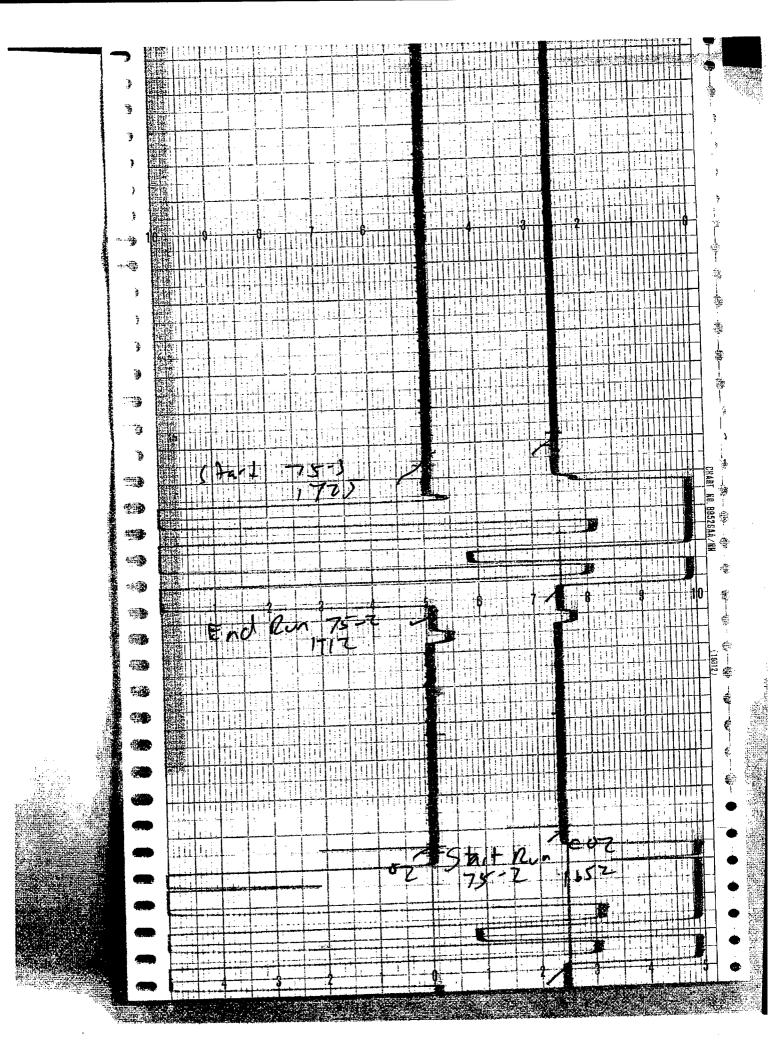


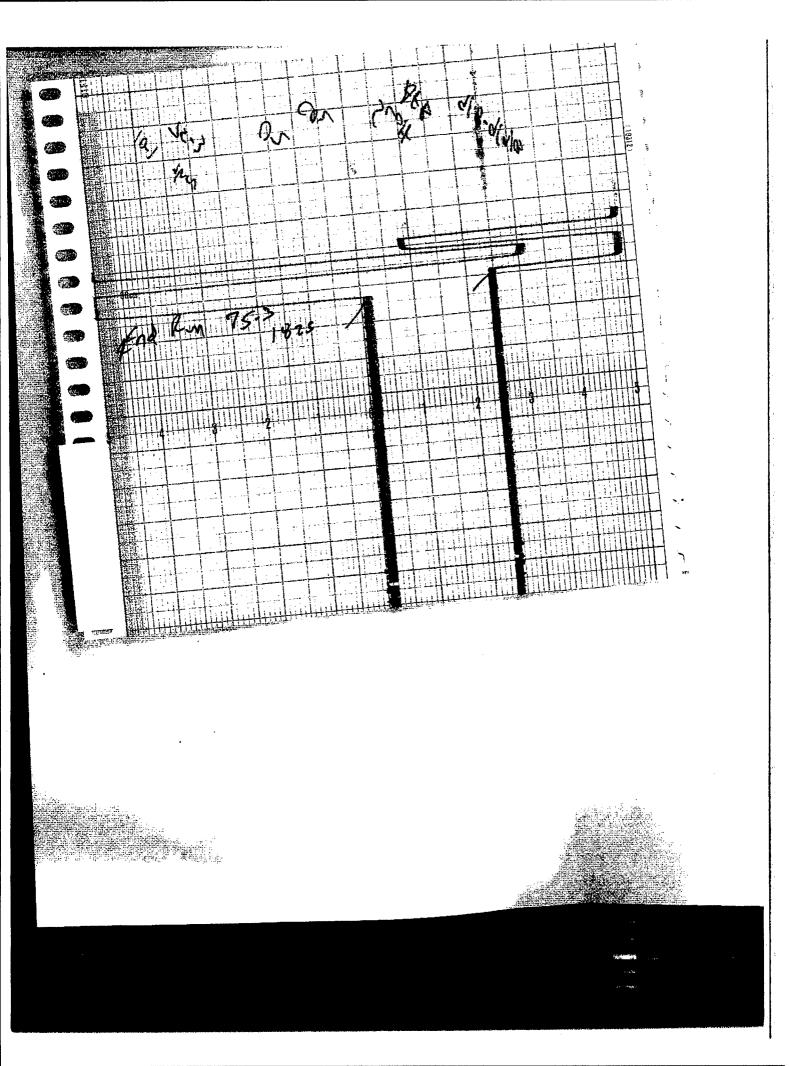


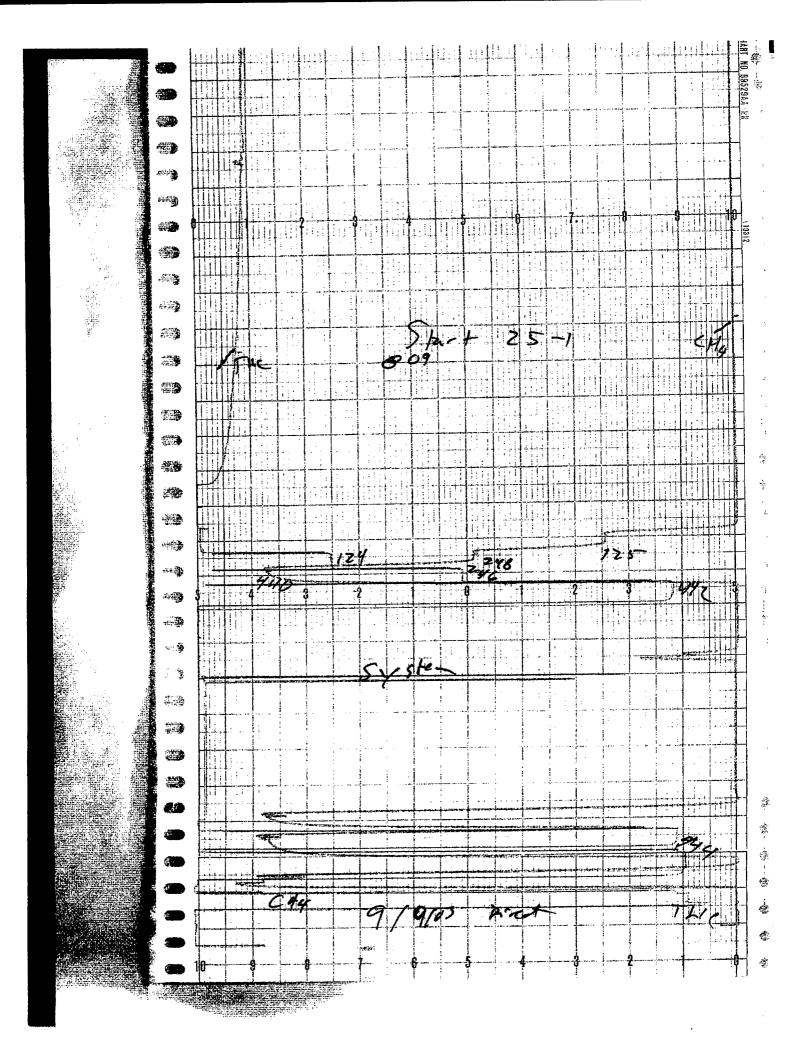


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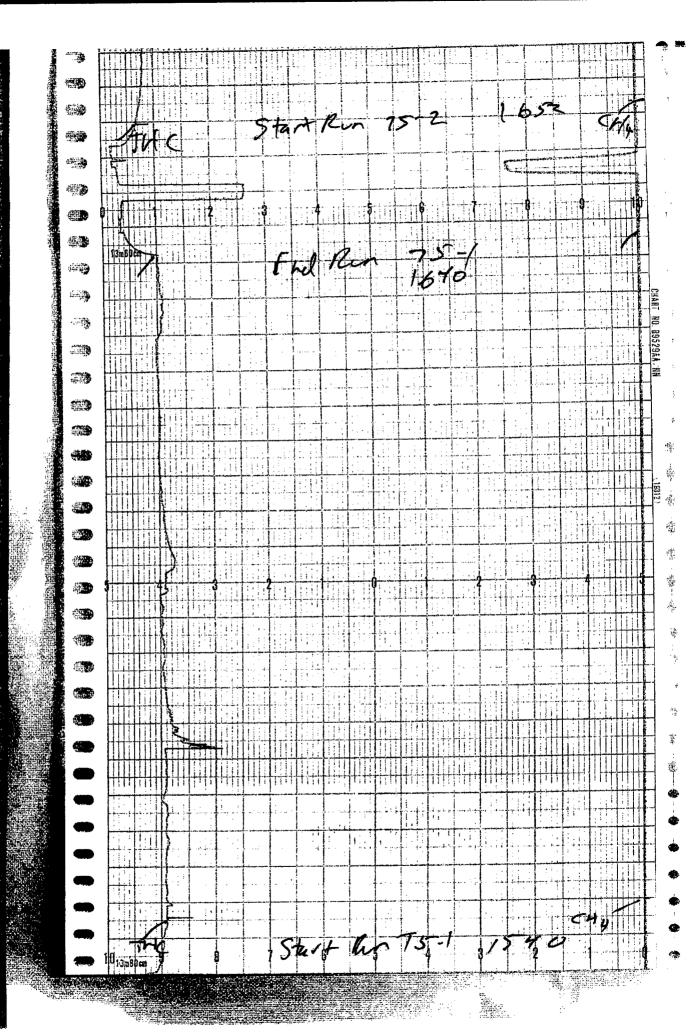


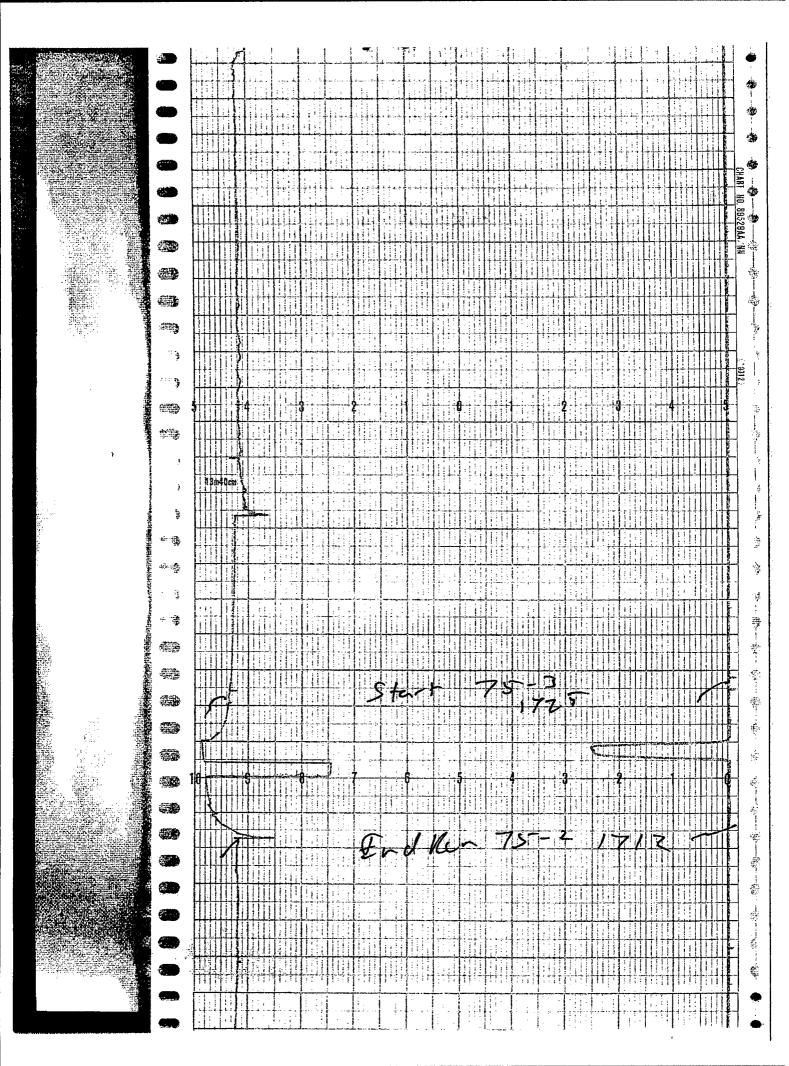


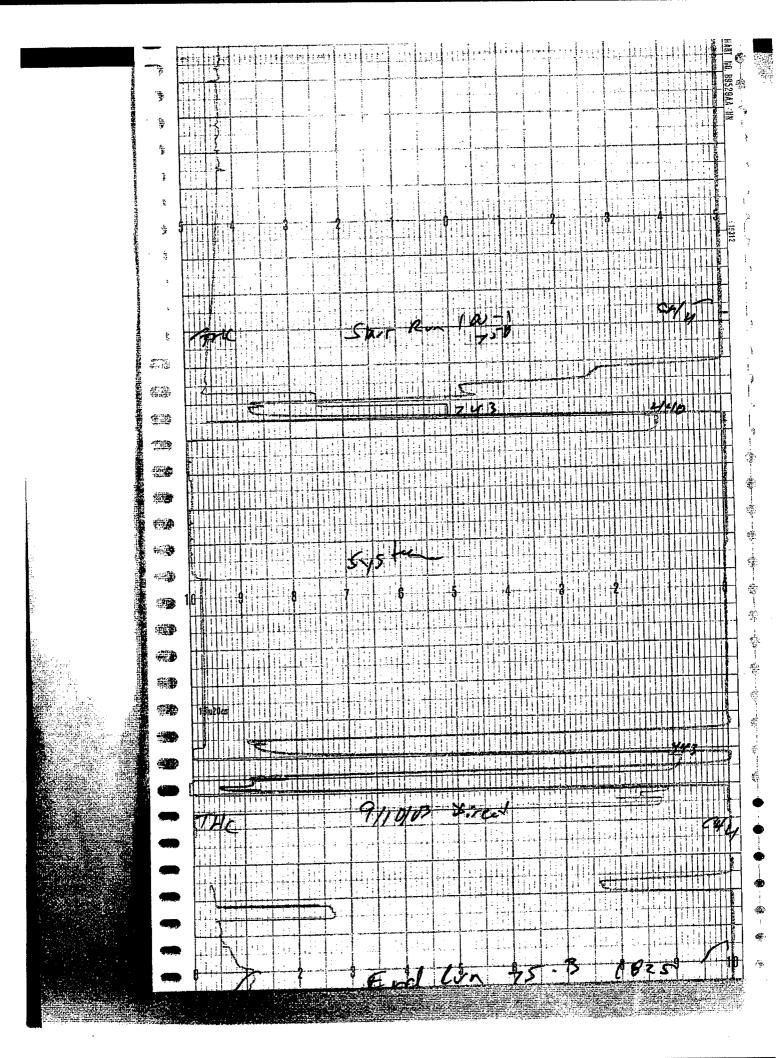
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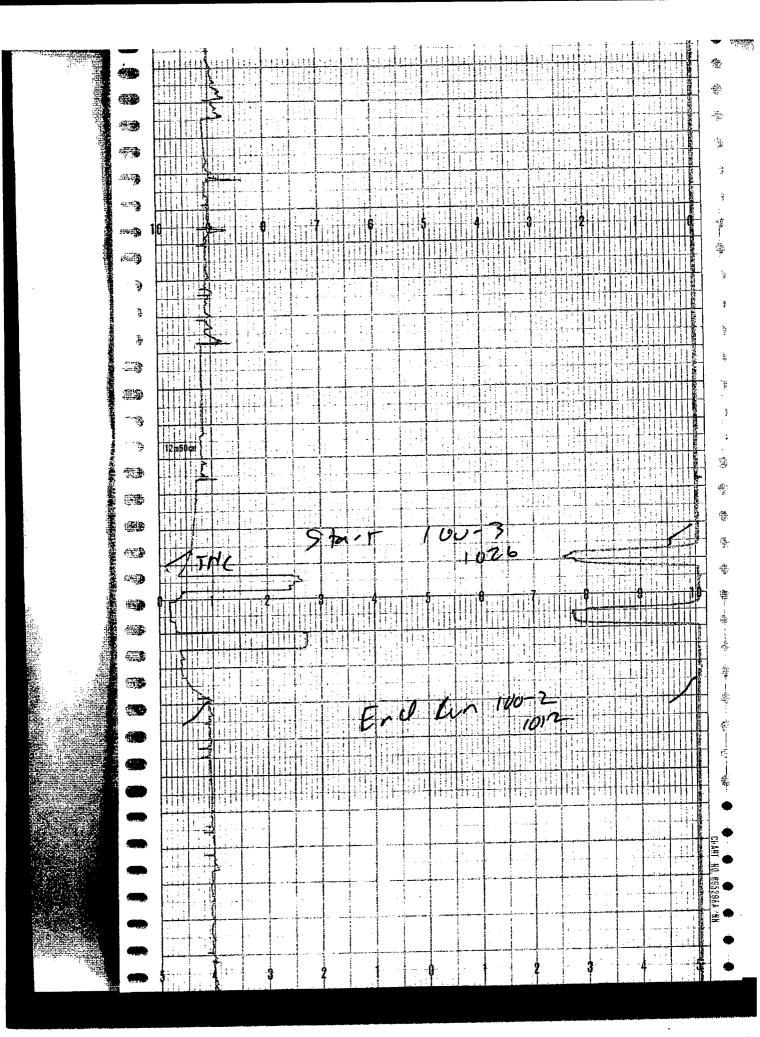
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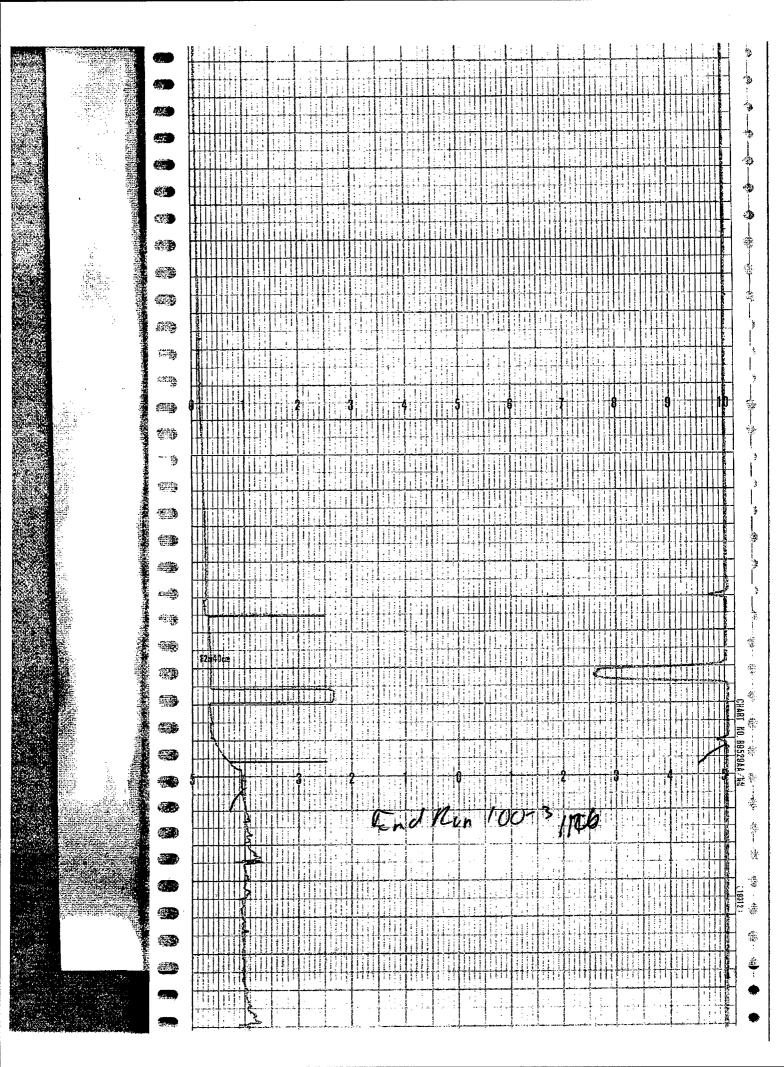






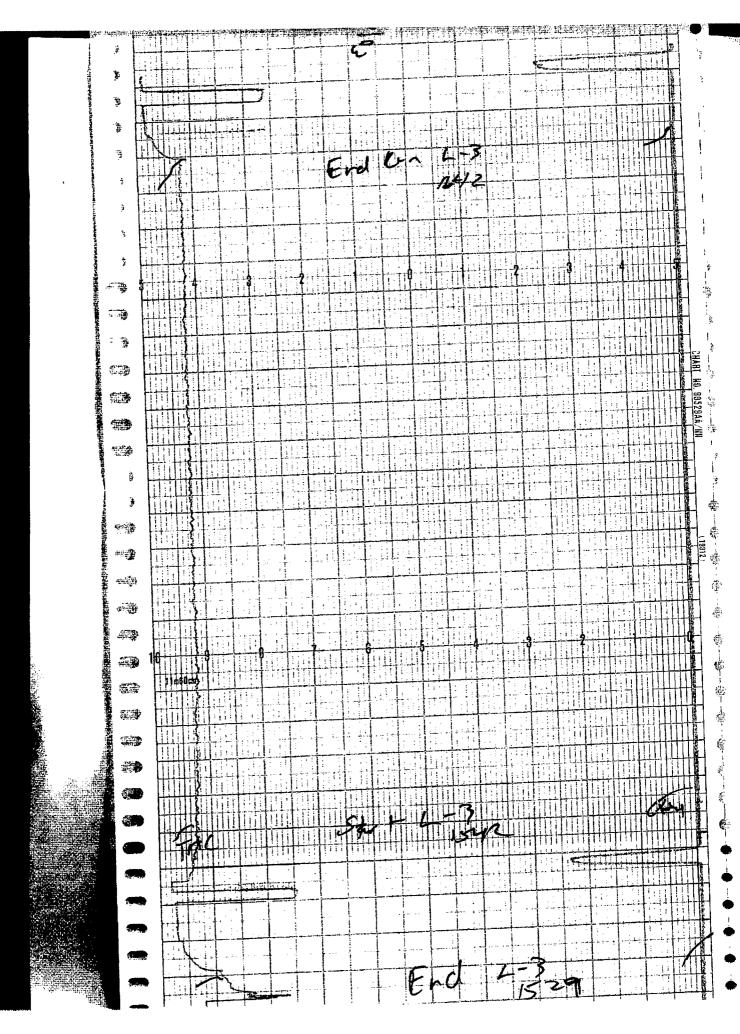
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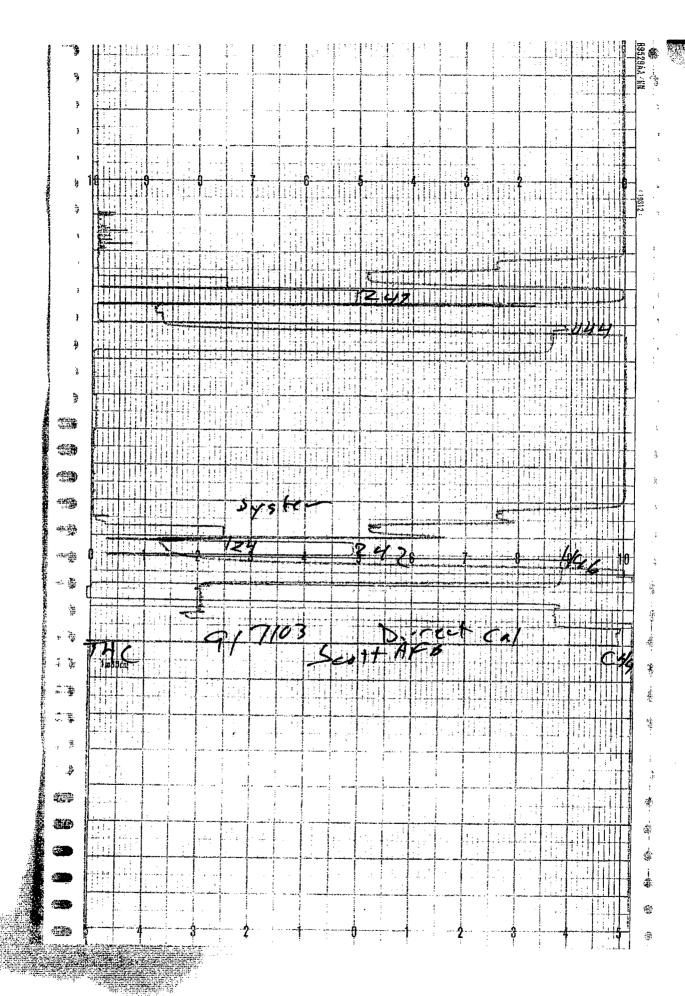
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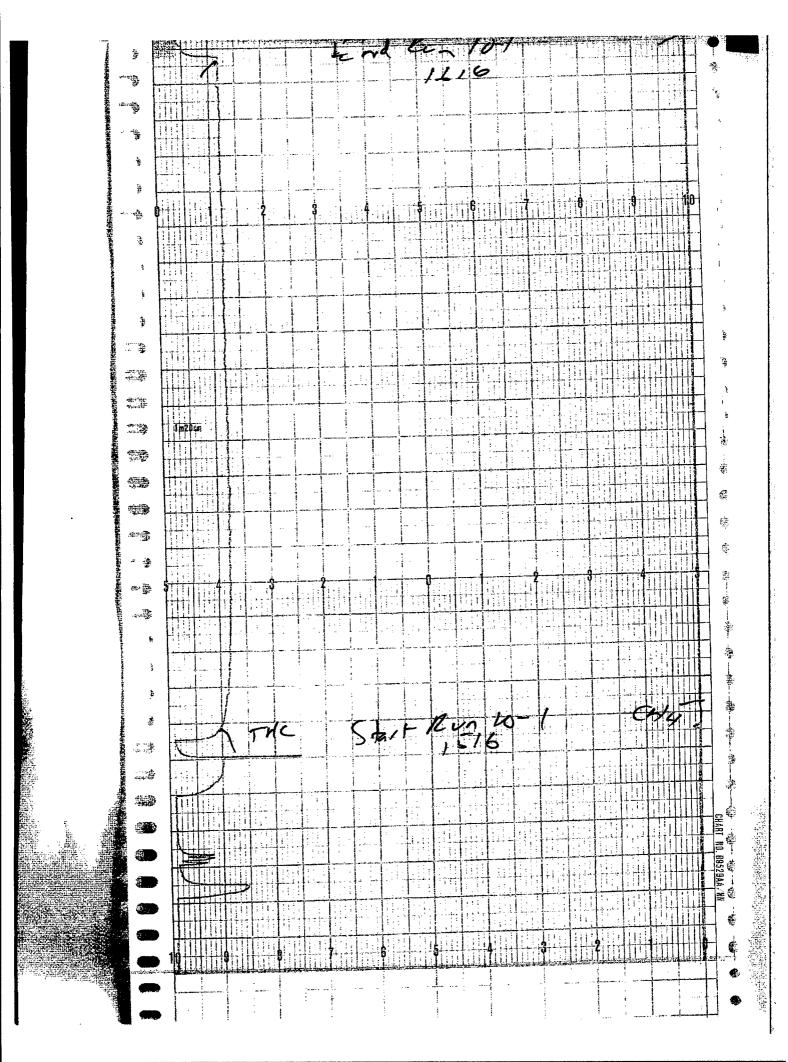


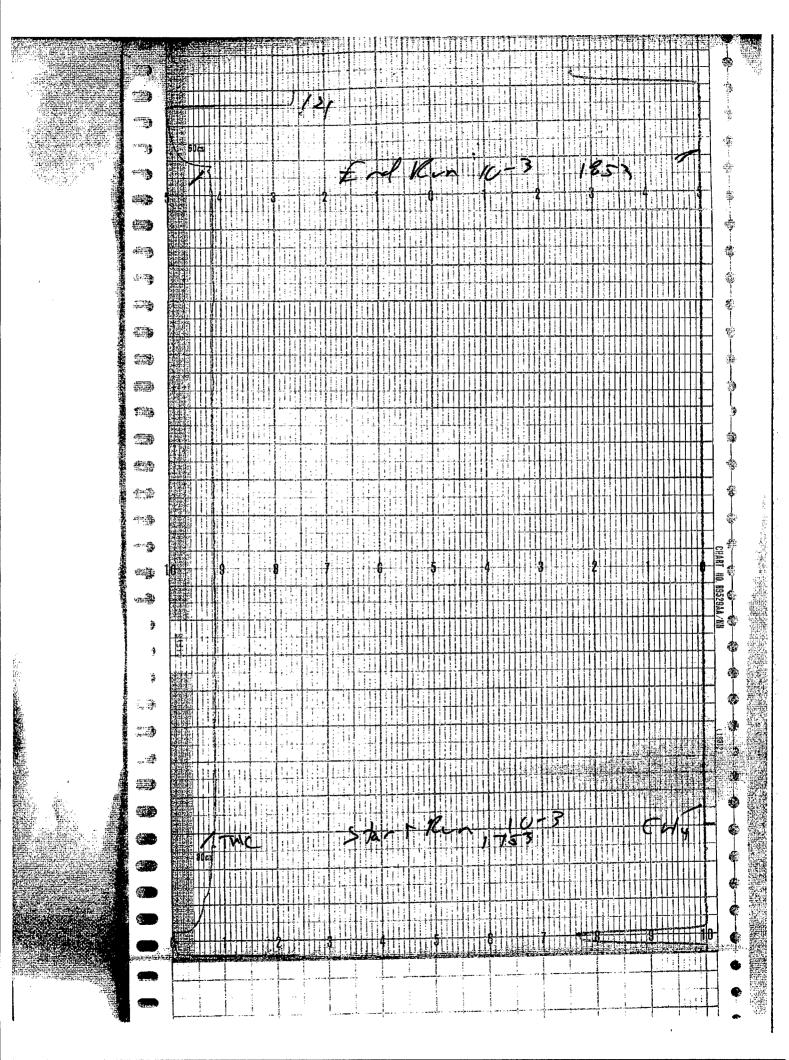
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HOS CENT CLAT CLAT. STARP RELIABLE (245) STARP RELIABLE (245) CAN 1 ZETZ ZO.60 A: 76/16 = 2.03/14/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1		Os =									
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CEM CALIBRATION DATA SHEET

A-C-025 Commonts 00 00 00 1.36.1 42.9 3; 1300 %Bias 753-1853 Post Test Run 3 Response ppm/% %Driff Time: / 2013 4.07 7 134 121 Ó Post Test Run 2 Response Time: 1637-Operator: D. Allppm/% %Drift 0.0 20.3 0.4 Date: Time: 15/6-16/6 Post Test Run 1 Response ppm/% % Error | ppm/% %Drift 10,4 رة 0.7 0,0 4.7 Direct Calibration -0.2 20.3 10:3 121 777 High 2017 120.2 120.3 472 Response 101.0-Time: |300 10.7 10. 124 442 4117 MID 248.8 24 Conc. 19. 12 mon High 465' 2 Mid 10:13 Mid 24,21 202 High 147 Low 149.4 Mid 10:15 9 Low Zero 🔰 Zero Low Zero Low Project No: Company: しば Location:

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CEM CALIBRATION DATA SHEET

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CEM CALIBRATION DATA SHEET

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Cyrd 10.7

-86 GENERATOR

FIELD DATA SHEET

Sample Type: Mortal S Run Number: 10-1 Date: 15 9-8-03
Pretest Leak Rate: -06 cfm @ 15 in.Hg.
Pretest Leak Check: Pitot: Orsat: Sampling Location: Generater 10 % Lon Plant: Scott Air Force Base

Phar: 30.65 Ps. 7.3
CO₂: 3.2

Probe Length/Type: 3 Ev. Pitot#: As: _ Stack Diameter:

K= 1.89

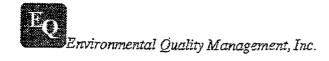
Assumed Bws: Filter #: 830573
Meter Box #: 7 Y: 1.006 AH@: 1-631 Post-Test Leak Rate: cfm @ in.Hg. Post-Test Leak Check: Pitot: Orsat: Thermocouple #: Nozzle ID: 195

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Pump	(in. Hg)		73	7	$\mathcal{C}_{\mathbf{I}}$	K	h	Ŋ	R	d	R	C	B	Ŋ	R	N	7	C	R	u	み	لع	K	て	B	8	
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Dry Gas Meter Temp. Tm	Inlet		48	28	83	64	هڪر	28	28	88	68	90	61	82	93	63	hb	hb	95	95	95	96	96	97	97	62	\ ₊
1	Temp. °F		2.5	65	24	53	52	25	200	Q9	19	19	62	19	5.3	85	57	2.5	27	2.5	5.6	2.5	22	57	57	2.5	
iture ° F	Filter		150	250	150	250	155	080	250	250	8hC	255	250	250	150	250	349	248	250	150	150	250	250	152	250	0SC	
Temperature ° F	Probe		250	150	056	052	250	250	250	ISC	249	125	248	135	250	250	6h2	250	ShC	250	249	150	250	248	150	34C	2
Stack	Temp (Ts)		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	200
ΔĤ	Actual		2.2	2.2		2.2	2.2		7.7	7.7	7.7	ر. لا		۱ 🖈	2.2	2,2	なら	2.2	•	2.5	2.2	2.5	2.2	2.2	2.2	2.2	/
4	Desired		2.2	2.2	2.0	2.2	2.2	2.2	0.2	2.2	2.2	2.2	2,2	2.2	2.2	2.2	٦.٧	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	
Velocity	Head		1,61	1.61	1.61	1.61	1.61	19.1	19.1	1901	1.61	1.61	19.1	19.1	1.61	1.61	1.61	1.61	19.1	1.61	19.1	19.1	19.1	1.61	19.1	19.1	70-
Gas Meter	Reading	348.723	350.7	352.8	354.9	357.0	359.0	361.0	363.2	365.2	367.3	369.4	371.4	373.5	375.5	378.0	379.7	381.7	383.8	385.7	388.0	390.0	392.2	394.3	396.5	398.552	1000
Clock	ime S	2	15:16	15:18		15:33	15:25	15:28	15:30	15:33	 . 	15:38	0h:S1	15:43	15:45	84.31	15:50	15:53	15:52	85:51	00:91	16:03	50:91	80:91	01:91	16:13	
Sampling	Time	0	25		5	0/	12.5		17.5	200	22.5	25	10	õ	32.5	1	1.		12.5 1	45 1	12.5 I	င္ပ	52.5	55	<u> </u>	1	,
Traverse	Point	0																									

0Vm = 49.8294 JAp = 1.27 V AH = 2.2 V Ts = 300

Tm = xx /

3372.1



SAMPLE RECOVERY DATA

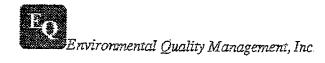
Plant	SLOTT A	R FORCE BASE		Run No.	10-5-1					
Date 9/	8/03	Sample Box No.	HSB 1	Job No	8 30573					
Sample I	ocation 10 %	Load		Filter No	830573					
Train Pre	parer Di									
Sample R	ecovery Person	9 4								
Commen	ts		····							
Front Hal	f									
Acetone		Liquid								
Container	No	Level Marked _	Sealed_							
Filter										
Container	No. Alas		helce2							
Commina	110. 12		Scalcu _							
Descriptio	on of Filter	?lack - c	loca-+	Louding						
Samples S	stored and Locke	:đ								
Doole Walf	7) f = \$									
Back Half	No			•						
Communica	140.									
Liquid Lev	vel Marked		Sealed							
Imp. No.	Common	Initial Vol		Weight (grams)						
	Contents	(ml)	Initial	Final	Net					
1	DE HEO	اص سر	731.3	746.1	14,8 1					
- 2	DI 420	100-1	714.5	728.9	14,4 V					
. 3	-	.=	621.2	6232	2.0					
4	Silica Gec	<u>.</u>	849.2	858.4	9,2 /					
. 5										
6 .				_	, , /					
	Total		ji.		40,4 1					
			<i>j</i> .							
Jecurinaion	of Impinger Ca	tch: 6/60	·~k.							

Sampling Location: General Posts Sample Type: Merked Soperator: mr Run Number: 13-8-5 Ps: 7.3 Pretest Leak Rate: -004 cfm @ 13 in.Hg. Pretest Leak Check: Pitot: Corsat: Stack Discrete Pitot: Corsat: Stack Discrete Pitot: Corsat: Stack Discrete Pitot: Corsat: Corsat: Stack Discrete Pitot: Corsa

Nozzle ID: 0.175 Thermocouple #:
Assumed Bws: Filter #: PC025
Meter Box #: 7 Y: 1.006 AH@: 1.631 Post-Test Leak Rate: . 601 cfm @ 12 m.Hg. Post-Test Leak Check: Pitot: ____ Orsat: ___

	mmn										······································													_*		B
(in. Hg)		ተ	ل م	h	9	7	7	7	00	۵	۵.	٥	0/	0/	0/	11	1.1	11	اع ا	12	4	(a)	لا/	ر لا	7	
Outlet		88	مو ک	00	& &	ა ტ	88	88	<u>ئ</u> ئ	88	88	88	& &	88	00 00	8 8	00 00	&	88	88	& &	8	88	88	88	ائم ا
Inlet		88	80	90	16	१३	92	93	83	44	<u></u> አፋ	94	94	44	46	49	44	94	ЬЬ	44	93	93	93	93	93	$T_{\text{m}} = 90.$
Temp. °F		99	09	مري	hs	hS	55	2.4	55	9.5	58	57	2.8	2.8	59	28	09	29	9	59	90	60	99	19	09	
Filter		256	250	152	251	250	250	750	250	250	250	253	252	249	250	250	256	150	150	250	250	150	250	246	250	4
Probe		253	150	250	250	036	152	036	250	6hC	250	bhc	250	250	250	250	250	250	ISC	250	250	250	250	250	250	15 th
Temp (Ts)		300	300	300	300	38	300	300	210	510	510	2/0	510	510	510	510	2/6	210	210	510	510	5/10	0)5	210	510	Ts = 5
Actual		7.2	2.2	2.2	2.2	2.2	2.2	7.n	4	2.1	ي.	2.1	2.1	2.1	2.1	1.0	7.0	7-10	7.0	2.1	20,-	7.2	2.1	1.0	2.1	2.13
Desired		2.2	2.2	0.2	2.2	2,2	2.2	<u>ا</u> ہٰ:	2.	2.1	7.	0.7	2.1	2.1	1.0	2.6	1.0	2.1	2.1	1.6	2.1	2.1	7.1	2.1	2.1	
Head		19-1	1.61	197	1.61	1.61	1.61	19.1	1.99	99.1	1.97	1.99	1.99	1.79	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	= 1.37
Reading	399.494	9.101.6	403.6	405.7	407.7	409.8	8.114	413.9	0.915	418.0	418.9	421.8	424.0	425.9	427.9	430.0	431.9	433.9	435.9	438.0	0, 041	5. 14h	443.9	1.3%	448.041	~Vm = 48.547 / 4p =
Time	+	1-	+-	+	+	 	1~	 	<u> </u>	—	17:02	17:04	17:07	7:09					7:22	 	+	+	 -		1-	Vm = 4
Time	_				Ī	1.	Τ	_	1		_	T		1			1	T	1	1	_	1,				
Point	Number) -																								
	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp Dutlet Outlet	Time Reading Head Desired Actual Temp (TS) Probe Filter Temp of Inlet Outlet	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp of	Time Time Reading Head Desired Actual Temp (TS) Probe Filter Times of Inlet Outlet O 16:37 399.494	Time Reading Head Desired Actual Temp (TS) Probe Filter Temp of Inlet Outlet O 16:37 399.494	Time Itm Reading Head Desired Actual Temp (TS) Probe Filter Temp of Inlet Outlet O 16:37 399.494 2.5 16:37 401.6 .61 2.2 2.2 300 251 256 66 89 88 5 16:42 403.6 .61 2.2 2.2 300 251 252 60 90 88 7.5 16:44 405.7 .61 2.2 2.2 300 250 251 55 90 88 10 16:47 405.7 .61 2.2 2.2 300 250 251 54 91 88	Time Reading Head Desired Actual Temp (TS) Probe Filter Temp of Inlet Outlet 2.5 16:37 399.494 2.5 16:37 401.6 1.61 2.2 2.2 300 251 252 60 90 88 7.5 16:47 405.7 1.61 2.2 2.2 300 250 251 55 90 88 10 16:47 407.8 1.61 2.2 2.2 300 250 251 54 91 88	Time Itme Reading Head Desired Actual Temp (TS) Probe Filter Temp of Inlet Outlet 2.5 16:37 399.494 2.5 16:37 401.6 1.61 2.2 2.2 300 251 252 66 89 88 7.5 16:44 405.7 1.61 2.2 2.2 300 250 251 55 69 89 10. 16:47 407.7 1.61 2.2 2.2 300 250 251 59 88 12.5 16:49 409.8 1.61 2.2 2.2 3.2 300 250 55 59 88	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp of Inlet Outlet 2.5 16:37 399.494 2.5 16:37 401.6 1.61 2.2 2.2 300 251 252 60 90 87 5 16:42 403.6 1.61 2.2 2.2 300 250 251 67 88 10 12.5 16:47 407.7 1.61 2.2 2.2 300 250 251 54 91 88 12.5 16:52 411.8 1.61 2.2 2.2 300 251 250 59 58 15.5 16:52 411.8 1.61 2.2 2.2 300 251 250 59 88	Time Reading Head Desired Actual Temp (TS) Probe Filter Temp, "F Inlet Outlet 2.5 16:37 399.414 1.61 2.2 2.2 300 253 256 66 89 88 2.5 16:42 403.6 1.61 2.2 2.2 300 251 55 60 86 88 7.5 16:47 405.7 1.61 2.2 2.2 300 250 251 57 90 88 10 16:47 405.7 1.61 2.2 2.2 300 250 251 57 90 88 10.6:57 16:47 407.8 1.61 2.2 2.2 300 250 251 59 88 17.5 16:54 411.8 1.61 2.2 2.2 300 250 251 57 92 88 20 17.5 2.2 2.2 2.2 300	Time Reading Head Desired Actual Temp (Ts) Probe Filter Time Inter Outlet 2.5 16:37 39f. 4f4 1.6f 3.2 3.2 300 253 256 66 89 88 2.5 16:37 406.6 1.6f 3.2 2.2 300 251 55 60 86 7.5 16:47 405.7 1.6f 3.2 3.2 300 250 25f 57 90 88 10 16:47 405.7 1.6f 3.2 3.2 300 250 25f 57 9 88 10. 16:47 409.8 1.6f 3.2 3.2 300 250 25f 57 9 88 17.5 16:54 409.8 1.6f 3.2 3.2 300 25f 57 9 8 17.5 16:54 413.9 1.6f 3.2 3.2 300	Time Ilme Reading Head Desired Actual Temp (Ts) Probe Filter Temp. Trans. Time Illet Outlet O 16:37 399. 494 2.5 16:37 4001.6 1.61	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp. "Filter Temp.	Time Italia Reading Head Desired Actual Temp (TS) Probe Filter Timp of Inter Outlet 2.5 16:37 401.6 1.61 2.2 2.2 300 251 256 66 89 88 5.5 16:34 403.6 1.61 2.2 2.2 300 251 252 60 90 88 7.5 16:34 405.7 1.61 2.2 2.2 300 250 251 59 88 10. 16:47 407.7 1.61 2.2 2.2 300 250 251 59 88 10. 16:47 407.7 1.61 2.2 2.2 300 250 251 59 88 10. 16:54 413.9 1.61 2.2 2.2 300 250 55 93 88 10. 10.5 16:54 413.9 1.61 2.2 2.2 300 250 251 59 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 93 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 249 250 55 94 88 20. 10.5 16:57 416.0 1.99 2.1 2.1 510 250 55 58 94 88	Time 11me Reading Head Doestord Actual Temp (TS) Probe Filter Temp (TS) STY, 4194 March	Time Nandling Head Desired Adulal Temp(Ts) Probe Filter Timp of the could	Time Time Reading Head Desired Actual Temp (Ts) Probe Filter Timp out	Time Time Reaching Head Desired Actual Temp (Ts) Probe Filter Temp of Temp of Temp C 16:37 401.6 1.61 0.2 2.2 300 251 552 66 89 88 S 16:37 401.6 1.61 0.2 2.2 300 252 552 60 90 88 S 16:37 401.6 1.61 0.2 2.2 300 252 552 60 90 88 S 16:47 405.7 1.61 0.2 2.2 300 252 554 91 88 S 16:47 405.7 1.61 0.2 2.2 300 252 554 91 88 S 16:47 407.7 1.61 0.2 2.2 300 250 251 54 92 88 S 16:57 411.8 1.61 0.2 2.2 300 250 251 54 92 88 S 17:52 411.8 1.61 0.2 2.2 300 250 251 54 88 S 17:52 411.6 1.97 2.1 2.1 510 249 250 58 94 88 S 17:52 412.4 1.97 2.1 2.1 510 250 252 58 94 88 S 17:54 424.0 1.97 2.1 2.1 510 250 252 58 94 88 S 17:54 424.0 1.97 2.1 2.1 510 250 252 58 94 88 S 17:54 424.0 1.97 2.1 2.1 510 250 252 58 94 88 S 17:54 424.0 1.97 2.1 2.1 510 250 252 58 94 88 S 17:54 424.0 1.97 2.1 2.1 510 250 250 57 94 88 S 17:54 420.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:54 430.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.0 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.4 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.4 1.97 2.1 2.1 510 250 250 58 94 88 S 17:12 420.4 1.97 2.1 2.1 2.1 510 2.0 2.0 2.0 2.0 2.0 2.0 S 17:12 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4 420.4	Time Itme Reading Head Desired Actual Temp (TS) Fight Temp (TS) Temp (Time Time	Time Reading Hand Desired Actual Temp (Ta) Probe Filter Temp Time Coulet O 16:37 399.4194 Section Temp (Ta) Section Se	Time Reading Hand Donated Acoust Temp (TS) 399, 479 2,5 6:37 490.6 1.61 2.2 2.2 300 253 256 66 89 88 2,5 6:37 490.6 1.61 2.2 2.2 300 257 252 60 90 89 3,5 6:34 405.7 1.61 2.2 2.2 300 250 251 579 69 89 3,5 6:34 405.7 1.61 2.2 2.2 300 250 251 579 89 3,5 6:52 411.8 1.61 2.2 2.2 300 250 55 69 89 3,5 6:52 411.8 1.61 2.2 2.2 300 250 55 69 89 3,5 6:52 411.8 1.61 2.2 2.2 300 250 55 69 89 3,5 6:52 411.8 1.61 2.2 2.2 300 250 55 69 89 3,5 6:52 411.8 1.61 2.2 2.2 300 250 55 69 89 3,5 7:02 417.9 1.97 2.1 2.1 510 250 55 59 94 89 3,5 7:04 421.8 1.97 2.1 2.1 510 250 55 59 94 89 3,5 7:04 421.8 1.97 2.1 2.1 510 250 55 59 94 89 3,5 7:04 421.9 1.97 2.1 2.1 510 250 55 59 94 89 3,5 7:04 435.9 1.97 2.1 2.1 510 250 55 59 94 89 3,5 7:04 435.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:04 435.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 449.0 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 433.9 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 449.0 1.97 2.1 2.1 510 250 250 59 94 89 4,5 7:02 449.0 1.97 2.1 2.1 510 250 250 50 94 94 89 4,5 7:02 449.0 1.97 2.1 2.1 510 250 250 50	Time Nacoling Head Desired Actual Temp (Ts) Perde Filter Timps Inter Outet 16:73 397.4174 Sec. 1.61 2.2 2.2 3.00 2.53 2.66 6.6 8.9 8.8 2.5 16:34 4/0.1.6 1.61 2.2 2.2 3.00 2.50 2.51 5.9 6.0 9.0 8.8 7.5 16:44 4/0.5.7 1.61 2.2 2.2 3.00 2.50 2.51 5.9 9.0 8.8 7.5 16:44 4/0.5.7 1.61 2.2 2.2 3.00 2.50 2.51 5.9 9.0 8.8 7.5 16:47 4/0.5.7 1.61 2.2 2.2 3.00 2.50 2.51 5.9 9.0 8.8 7.5 16:47 4/0.5.7 1.61 2.2 2.2 3.00 2.50 2.51 5.9 9.0 8.8 7.5 16:52 4/1.8 1.61 2.2 2.2 3.00 2.50 2.5 5.9 9.0 8.8 7.5 16:52 4/1.8 1.61 2.2 2.2 3.00 2.50 2.5 5.9 9.0 8.8 7.5 16:52 4/1.8 1.61 2.2 2.2 3.00 2.50 2.5 5.9 9.0 8.8 7.5 16:52 4/1.8 1.97 2.1 2.1 5/10 2.50 5.5 5.9 9.0 8.8 7.5 16:52 4/1.8 1.97 2.1 2.1 5/10 2.50 5.5 5.9 9.0 8.8 7.5 16:52 4/1.8 1.97 2.1 2.1 5/10 2.50 5.5 5.9 9.0 8.8 7.5 7.50 4/2.5 1.79 2.1 2.1 5/10 2.50 2.50 5.8 9.0 8.8 7.5 7.50 4/2.5 1.79 2.1 2.1 5/10 2.50 2.50 5.9 9.0 8.8 7.5 7.50 4/2.5 1.79 2.1 2.1 5/10 2.50 2.50 5.9 9.0 8.8 7.5 7.50 4/2.5 1.79 2.1 2.1 5/10 2.50 2.50 5.9 9.0 8.8 7.5 7.50 4/2.5 1.97 2.1 2.1 5/10 2.50 2.50 5/9 9/0 8.8 7.5 7.50 4/2.5 1.79 4/40.5 1.99 2.1 2.1 5/10 2.50 2.50 5/9 9/0 8.8 7.5 7.50 7.50 1.99 2.1 2.1 5/10 2.50 2.50 5/9 9/0 8.8 7.5 7.50 7.50 7.50 7.50 5/9 5	Time Time Reading Head Degreed Actual Time	Time	Time

1.881



	SCOTT AIR	FORCE BASE		Run No.	1-5-2	
Date 9/	8/05	Sample Box No.	HSB-4	Job No	PC OZ S	
Sample I	Location 10% Le	pad- Generali-		Filter No.	PCOZ5	
	parer 5					
Sample F	Recovery Person	PA				
Commen	ts					
			•			
Front Ha	<u>lf</u>					
Acetone		Liquid				
Container	r No	Level Marked_	Sealed			
77214						
Filter Container	·No		0 1 1			
Contante	No		Sealed	• •		
Description	on of Filter A	1 h Lan	10			
2000.4200	DI 01 1 III	-048)			
Samples S	Stored and Lock	ed be				
*			······································		ga a statistica de la compansa de la compansa de la compansa de la compansa de la compansa de la compansa de l	
Back Half	/Moisture					
Container	No					
			Sealed_			
			Sealed_			
Liquid Lev	vel Marked		Sealed_	Weight (gra		-
			SealedInitial	Weight (gra		
Liquid Lev	vel Marked	Initial Vol (ml)	Initial	Weight (gra	ms) Net	_
Liquid Lev	Contents DE H20	Initial Vol (ml)	Initial 710.3	Weight (gra	ms) Net	
Liquid Lev Imp. No.	Contents DE H20 DE H20	Initial Vol (ml)	Initial 710.3 723.2	Weight (gra Final 779,9 733.8	ms) Net	
Liquid Lev Imp. No. 1 2	Contents DE H20 DE H20	Initial Vol (ml) [Oo	Initial 710.3 723.2 619.0	Weight (gra Final 779,9 733,8	ms) Net	
Imp. No. 1 2 3	Contents DE H20 DE H20	Initial Vol (ml) [Oo	Initial 710.3 723.2	Weight (gra Final 779,9 733.8	ms) Net	
Imp. No. 1 2 3 4 5	Contents DE H20 DE H20	Initial Vol (ml) [Oo	Initial 710.3 723.2 619.0	Weight (gra Final 779,9 733,8	ms) Net	
Liquid Lev Imp. No. 1 2 3 4 5	Contents DE H20 DE H20	Initial Vol (ml) [Oo	Initial 710.3 723.2 619.0	Weight (gra Final 779,9 733,8	ms) Net	

Sample Type: Mathed 5 C
Pbar: 30.65
CO₂: 3.2 Stack Diameter: Sampling Location: Generator 101, Local Run Number: 10-3 Date: 7-8-03
Pretest Leak Rate: 1001 cfm @ 12 in.Hg.
Pretest Leak Check: Pitot: Orsat: Plant: Scott A: Free Base

Operator: MV Ps: 7-3 CO₂: 3.2 O₂: 16.6 Probe Length/Type: 3** Pitot#:

As:

Nozzle ID: Thermocouple #:

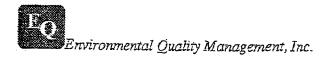
Assumed Bws: Filter #: \$30574

Meter Box #: 7 Y: 1.006 AH@: 1.631

Post-Test Leak Rate: 008 cfm @ 1 in.Hg.

Post-Test Leak Check: Pitot: Orsat: K=1.45 0.183

																								٤	0	今 (文)	1/6
Pump	(in. Hg)			_	_	_	_	_	_	-	-	_	_	~		1	`	,	-	_	1	-	1	-	/	_	
Dry Gas Meter Temp. Tm	Outlet		62	87	67	87	28	200	67	ص ف	8 &	88.	. 88	88	88,	من ص	 &	88	6.8	89	83	83	88	89	89.	8,3	7
Dry Gas Met	Inlet		87	88	90	6/	72	94	95	95	26	96	96	96	96	62	97	67	65	97	97	97	47	47	97	47	$\overline{Tm} = \frac{9/.5}{100}$
	Temp. °F		64	61	56	24	h5	54	54	24	53	24	53	hS	53	54	65	25	hS	حري	24	hS	54	S4.	54	24	
Temperature °F	Filter		252	hSC	252	150	250	250	250	755	150	250	250	bhc	150	249	250	150	150	348	150	6hC	250	250	osc	050	
Temper	Probe		756	150	646	250	250	250	250	050	250	249	250	250	251	ShC	250	250	250	250	OSC	350	250	OSC	250	250	210/
Stack	Temp (Ts)		015	2/0	510	510	510	210	210	210	510	0/5	510	510	015	210	510	210	210	2/0	210	210	5/10	510	510	015	Ts = 5
Чα	Actual		9.1	1.6	1.6	9.)	1.6	1.6	1.6	9.1	9.1	90/	1.6	9-1	9.1	9.1	7.1	9.1	1.6	1.6	9.1	1.6	9.1	1.6	9.1	9.7	1.60
٥	Desired		9./	1.6	1.6	9./	9.1	9:	1.6	1.6	9.1	1.6	1.6	7.1	9.1	9./	1.6	9.1	1.6	1.6	1.6	1.6	9.1	9.1	1.6	1.6	= HV 1/2
Velocity	Head		1.99	1.89	1.97	1.99	1.99	1.99	1.97	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99	1.99
Gas Meter	, Reading	148.286	450.1	451.9	453.8	455.6	457.4	459.3	0'/9/	462.8	464.7	466.4	468.2	1.02h	47/.8	473.7	9.56	477.4	479.2	1.184	482.9	484.7	486.4	488.3	1.064	492.019	$\Delta Vm = \frac{43.733}{\sqrt{\Delta p}} = 0.00$
Clock	e E	17:52	┼	17:57	17:58	┿	ho:81	18:07	-	 	-	\vdash	1	_	78:24	18.37	18:29	18:32	18:34	(8:37	18:39	Ch:81	hh:81	Lh:81	18: H3	18:52	$Vm = \frac{4}{4}$
Sampling	Time	0	2.5	1	1.	T	12.5	1	17.5	30	Ti	T	1.	1	7		1	T	42.5	_	12.5 I	1	1			09	
Traverse	Point Number	0	_																								



Plant	Scott A	IR FORCE BASE		Run No. /	330574
Date_9/	8703	Sample Box No.	HSB 3	Job No	•
Sample L	ocation General	for Exhaust - 10	1/2 Land	Job No Filter No{	330574
Train Pre	parer ST				
		DA			
Comment	z				
Front Hal		÷			
Acetone	*	Lionid			
		Level Marked _	Sealed		
		2010211111100			
Filter					
Container	No		Sealed_		
Description	n of Filter Bla	de loady			
Samples S	tored and Locks	xd			
Back Half	Maiatron				
	No				
Comanici.	140.				
Liouid Lev	vel Marked		Sealed		
			00		
Imp. No.	Contents	Initial Vol		Weight (gra	ms)
	Coments	(ml)	Initial	Final	Net
1	DIH20	امه سر	730.9	754,8	23.9
- 2	D= #20	100 m C	716.8	1222	5.4 1
3			607.8	608.3	0,5 1
4	SILICA GEL	_	849.1	856.0	1. 9
5	-1-7-460				W 1
6		-			
1	`otal		į.		367
			I	1	/ 1/2

Description of Impinger Catch: Cloudy

Majus



GAS VELOCITY AND VOLUMETRIC FLOW RATE

	Dlant.	Gods 1	9FB		Date: 9/6	3/03	
	Sampling 1	Cocation:	- 86 6	mentor Extrust (Tlock Time:	1,50 -	
,	Samping i	16 - 1, 2, 3	ou ce	Operators:	PK/T6		
	Poromotri	Drocours in	u _m 2	v.65 Static Press	sure in HoO:		
	Moisture	σ_{\sim} 3	Molec	cular wt., Dry: P	itot Tube Cn	0.99	
	Stock Dim	encion in Di	emeter or S	lide 1: 3.0" By	Side 2:	917	
	Wat Dulk			Dry Rulh °E	Dido D.		
1 Account	Ditat #	Γ	Therm	Dry Bulb, °F:			
pulition	rnoi#		Incin	locoupie #			
al.	Traverse	Velocity	T	$\int Md = (0.44 \times \% CO2) + (0.32 \times \%$	02)+(0.28×% N2)		
0/1	Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times)$	$+(0.28\times)$		
	Number	in.H ₂ O		Md = 29.5	, (,		
0 1	1144	ALLEZ O	F	Md = f(r)	п о)		
for 1	<i>i</i>	5.5	510	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\%}{100}\right)$ $Ms = () \times \left(1 - \frac{100}{100}\right) + 18\left(\frac{\%}{100}\right)$	100		
1550	2	5.9	5,2	1 (100 / (1	Litatie	-	
1554	3		5/2	$Ms = () \times (1 - \frac{1}{100}) + 18(-\frac{1}{100})$	200	r À	
1554	4	leil	6,2	1 100) (10	" + 4.6	2	
, •		6.0	1211	Ms = 30.9828.8			
	1-7-	3,7	517	$\frac{ms}{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}$	F+460)		
•	<u> </u>	7,9	2/2	S.P. ,			_
	2	6./	516	$Ps = Pb + \frac{S.P.}{13.6} = ($)+	13.6	0.0873	3 ft2
		6.3	0.4	Ps = 30.9 in Hg		0,007	
	3	161	2/7	 		120.8 /11.	3 -
	7	6.0	15/5	$-\sqrt{\Delta P} = -\sqrt{2}$		1,011	
	3	5.7	5/3 5/1 5/0	$V_S = 8549 \times C_P \times \sqrt{\Delta P} \times \sqrt{\frac{T_S(^{\circ})}{P_S \times 1}}$	<u>R)</u>	1,011	
	6	3.3	5/0	Ps ×		2 -2-83	
,		825.9	513	$-V_{s} = 8549 \times () \times ($)×√	#01, V	
10%	2	3,5 6,0	714	0 110	Y	8553	_
Ca letim		61	5/6	- 6 (, 0), ,			n. 8
n 7	4	6,0	515	$As = ft^2$		XP [.99 4	as Vice
Combition Aun 2	<u> </u>	5.3 4.8		$Q_s = V_s \times A_s \times 60$		DP 1.99 f	
	6		510				
710-		5.5	513	$Q_{5} = \times \times 60$)	. 10 -	
		3,8	514 516 315	Qs = 632.7acfm	クチ	otic =	
	5	6.1	5/6	Ps (.	% H ₂ O)	3.5"	
	4	6.0		$Qs_{std} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{Ps}{Ts}\right)$	100	2.3	
	5	5,8	514	$Qs_{std} = \times 17.647 \times \cdots$	x(1)		
	6	5.6	512	- 510	(100)		
				$Qs_{sid} = 345.3 dscfm$			
		$\sqrt{\Delta P} =$	$\overline{Ts} =$	$Qs_{sid} = \mathcal{A}^{-2}$ ascim			
	Am 1	iP=5.9	75=512				
	A. A.	2 2.43	17 116	-			
	11 TT 4 TT 7777 A	TO A COUNTY A 2 Thousand	:- al Earmal Eic	ald Data Chaptel Gas Valocity as	d Volumetric Flow	Pate doc	

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EQ Environmental Quality Management, Inc

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant:	Slott	AFB	Date: 9/6/03 Clock Time: 1805-18/0
Sampling l	Location:	86 Cer	Clock Time: 1803 - 18/0
Run #:	10-3		Operators: Ok 16 Static Pressure, in H ₂ O:
Barometric	Pressure, in.	Hg:	Static Pressure, in H ₂ O:
Moisture,	%:	Molec	Side 1: Side 2:
Stack Dim	ension, in. Di	ameter or S	lide 1: Side 2:
Wet Bulb,	°F:		Dry Bulb, °F:
Pitot#		Therm	Dry Bulb, °F:
Traverse	Velocity		$\int Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
Number	in H ₂ O	Temp,°	Md =
		F	MU = (840) (840) GAii =
1	60	5/3	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right) $
2	6,2	512	+35
3	6.2	5/3	$Ms = () \times (1 - \frac{100}{100}) + 18(\frac{100}{100})$
4	6.1	514	Ms =
5	59	513	
4	5,4	511	$\overline{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
1	6.1	515	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
2_	59	515	13.6
3	50	514	Ps = in Hg
4	57	5/2	$\sqrt{\overline{\Delta P}} =$
3	5.3		
7	51	5/0	$Vs = 85 \ 49 \times Cp \times \sqrt{\Delta P} \times \sqrt{\frac{Ts(^{\circ}R)}{Ps \times Ms}}$ $Vs = 85 \ 49 \times () \times () \times () \times \sqrt{\frac{CP}{Ps \times Ms}}$
		770	₹ Ps × Ms
			$Vs = 85.49 \times () \times () \times $
		<u> </u>	Vs = ft/s
		<u> </u>	$As = ft^2$
		<u> </u>	$Qs = Vs \times As \times 60$
	<		√
	<u> </u>	<u> </u>	Qs = × ×60
			Qs = acfm
			$Qs_{std} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2O}{100}\right)$ $Qs_{std} = \times 17.647 \times \times \left(1 - \frac{\% H_2O}{100}\right)$
			12 100
			$ys_{std} = x11.041 \times \times \left(1 - \frac{100}{100}\right)$
L	TAP -	To-	$Qs_{std} = dscfm$



S H AEB

GAS VELOCITY AND VOLUMETRIC FLOW RATE

9/9/03

	Plant:	Sot A	F(13		Date: _	9/9/03	
				-75% Load	Clock T	ime: 080	00-08/0
	Run #	25-1		Operato	ors: TG	MK	
	Rarometric	Pressure in	Ho: 30-	69 Static Pr	ressure, in	.H ₂ O:	9.0
	Moisture 9	6. 42	Molec	ular wt., Dry:	_Pitot Tul	be, Cp:	7, 99
	Stack Dime	nsion in Di	ameter or S	ide 1:	Side 2:		
	Wet Rulh	°F•		Dry Bulb, °F:			
	Pitot #	<u> </u>	Therm	_ Dry Bulb, °F: nocouple #		_	
					~ ~ \ \ /a:	noa ar-\	
	Traverse	Velocity		$Md = (0.44 \times \% CO2) + (0.32)$ $Md = (0.44 \times) + (0.32)$ $Md = 2 $. X 20 0 2) + (0.	2020112)	2 hotiz
Condition Total O757	Point	Head	Stack	$Md = (0.44 \times) + (0.3)$	$2 \times 1 + 0$.28 ×)	nuran
Cerela	Number	in.H ₂ O	Temp,°	Md = 29.276		±Q.	6
3 .j			F	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 10$	$8\left(\frac{\% H_2 0}{}\right)$	77.	Ø
10A1 0757	(6.7	518	$\int_{0}^{\infty} Ms = Ma \times \left(1 - \frac{100}{100}\right)^{-1}$	(100)	•	
9800	2	6.9	524	W () () ()	()		
a Game		6,9	524	$Ms = () \times \left(1 - \frac{100}{100}\right) + 1$	(100)		
	4	6.7	524	Ms = 28,82			. 4 973
	3	65	522	$-\frac{1}{Ts} = $ °F =	°R(°F +460)	C	rea - 0,0873
	(é	5,8	522		•		
	1	6,4	517	$P_{5} = Pb + \frac{S.P.}{13.6} = ($	+	٧s	= 125.0 fs
	2	6.9			1.5.0	•	
	,	68	527				
	4	6.6	524	$\sqrt{\Delta P} =$		AP	- 2-006
	5	52,5,8	523		$Ts(^{\circ}R)$		
	b	4 4	529	$V_S = 85.49 \times C_P \times \sqrt{\Delta P} \times \sqrt{-1}$	Ps × Ms		
0 10-2	,	6.4	542	1	()×		
Condition 2	2	12,6	545	$V_s = 8549 \times () \times ($	()	V	
Ris. 2	2	10,9	547	$V_{s} = 222.4 fils$		_	÷ - 1
Ocis. I	У	7	548	$As = ft^2$		Jun 2 4	techic = 12.5"
6071-	5	7.3	548				
0936-	6		547	$Qs = Vs \times As \times 60$,	MD = 27, 7	·
0943	1	7.3 5.7	546	$\bigcap_{0} s = \times$	×60	95 = 2901	
0117	2	6.8	54B	Qs =	6	P5 = 31.35	
	3	10.9	540		(% H ₂ 0 \	Vs = 231.	3
	4	6.9	548	$Qs_{std} = Qs \times 17.647 \times \frac{Ps}{Ts} \times \frac{Ps}{Ts}$ $Qs_{std} = \times 17.647$	$\sqrt{1-\frac{2}{100}}$	acla: l	81.9
	5	7.0	549	$0.00 = \times 17.647$	1××(1	16.363.9
	6	7	545	2 sid	(100)	
			/	7541			
	# ($\sqrt{\Delta P} = 7.5$	SZ = SZ	$Qs_{std} = 35^{1} \sqrt{dsc}$:Jm		
	#12	2.50	ig 54	- 7·			
		~//	• • • • • • • • • • • • • • • • • • • •	•			

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ta Sheets\Gas Velocity and Volumetric Flow
$$130.2 \, \text{ft}^{\text{s}}$$
 $39.957 \, \text{sp} = 2.14''$



GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant:	Scott	ATO		Date:	9/9/03
Sampling 1	ocation.	- BE	Genoration	Clock T	4/9/15 ime; 1053 -
Run #:	Courliston	2, R	Operator Static Pro	s: <u>R/</u>	6/16
Barometric	Pressure, in.	Hg: '30.	69 Static Pro	essure, in	.H ₂ O:
Moisture,	%: <u> </u>	Mole	cular wt., Dry: Side 1: 3 "	_Pitot Tul	be, Cp: 0,99
Stack Dim	ension, in Di	ameter or	Side 1:	Side 2	
Wet Bulb,	°F:		Dry Bulb, °F:	_	_
Pitot #	Starla	Ther	Dry Bulb, °F:		_
Traverse	Velocity		$ Md = (0.44 \times \% CO_2) + (0.32 \times \% CO_2) + (0.3$		
Point	Head	Stack	$Md = (0.44 \times) + (0.32)$	\times $+{0}$	28×) contil
Number	in.H ₂ O	Temp,°	Md = 29.34	, ,	7/2
1		F	(0, 4 0) /	(n.u.p.)	4254
1	6. B	554	$Md = 29.34$ $Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{1}{100}\right)$	100	7 2 1
2	6.9	555		" \	
3	6.8	555	$Ms = () \times \left(1 - \frac{100}{100}\right) + 18$	100	
4	65	551	$M_s = 28,87$	(720)	
5	6,5	552	- Ms - Zuvi	(0)	
lo	1014	551	$-\sqrt{Ts} = r = r = r$	(F+460)	
7	7.1	552	$Ps = Pb + \frac{S.P.}{13.6} = ($) +		
L	6.9	854	,,,,,	13.6	
3	6.7	553	Ps = 30,87 in Hg		
4	4.5	553	$\sqrt{\Delta P} =$		
5	6.3	551	Ts	(°R)	
(4	B15,8	550	$V_{S} = 85 \ 49 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}}{P_{S}}}$	× M s	
			$-V_{s} = 8549 \times () \times ($		
			Vs = 23/4 6 ft / s		130.2 fps 90.23
			$As = ft^2$		
			1		90.23
			$Qs = Vs \times As \times 60$		
ļ			$Qs = \times \times$	60	b1=2.1"
			-Qs = 6821 acfm		Pl = 7.1
		<u> </u>		% H20)	
	<u> </u>	· · · ·	$Qs_{std} = Qs \times 17.647 \times \frac{Ps}{Ts} \times \left(1\right)$	100	,
		<u> </u>	$Qs_{sid} = \times 17647 \times -$	×[1-	100
			~{	`	(00)
	T 0 //	=	$Qs_{sid} = 352.4 \ dscfm$		
	$\sqrt{\Delta P} = 1.56$	7 Ts=553	20510 77007 2007		
An	7 DP = 6.6				

\\HAWK\ADMIN\Air Testing\Forms\Field Data Sheets\Gas Velocity and Volumetric Flow Rate doc $H'' = 0.0873 \, \text{ft}^2$

Sample Type: Marthed Soperator: Marthed Society Property CO2: 4.1 O2: 15.2

Probe Length/Type: 3 Ft. Pitot#: Stack Diameter: 4 No. As: Stack Diameter: Generaler 25% Lose

0.195 K= 1.76

																				E	o,	10	71/6	,
Pump Vacuum	(in. Hg)		_	-	1			_	1	~	-	-	,									,		
r Temp. Tm	Outlet		6	62	62		63	19	65	99	67	88	68	70									7	
Dry Gas Meter Temp. Tm	Inlet		1,9	63	99	83	16	73	25	92	28	79	08	8/									Tm = 6	
Impinoer	Temp. °F		62	45	20	52	57	24	55	53	hS	24	25	55									•••	
ture °F	Filter		150	250	150	250	0,50	152	248	122	250	250	250	osc										
Temperature °F	Probe		750	250	250	250	250	250	250	250	249	250	250	250									$\frac{\omega}{2}$	
Stack	Temp (Ts)		523	523	523	523	523	523	523	523	523	523	823	523				,					Ts= 52	
1	Actual		1.9	6.	6.1	1.9	1.9	1.9	1.9	1.9	1.9	1.9	6.	1.9									1.92	
Ησ	Desired		1.9	1,9	1.9	6.9	6.	1.9	1.9	1.9	1.9	1.9	5.	0.										
Velocity	Head		2.01	2.01	2.01	2,01	7.07	2,01	2.01	2.01	2.01	7.0.0	70.0	10.0									100 = 1.421	
Gas Meter	Reading	492.280	496.2	6 667	563.8	5.07.6	511.3	515.1	519.0	522.7	5.965	530.1	534.0	198.185							,		7	
Clock	Time	60:80	+	+	 			68:39				48:59	40:4 C	66:60						1			[∆] Vm = 45.61	
Sampling	Time	0					1	1	١.	1	١.		1.										Q	
Traverse	Point	Q																						



Environmental Quality Management, Inc.

SAMPLE RECOVERY DATA

Plant Sc.	off Af	= B		Run No. 25	30572
Date 2/4/	103	Sample Box No. 1	15B-1	Job No.	
Sample Loc	cation General	e Enhand Low	din - 25 %	Filter No8	30572
Train Prepa	rer DA				
		724			
Front Half					
Acetone		Liquid			
Container l	Vo	Level Marked	Sealed		
Filter					
Container I	Vo		Sealed		and the same of th
-	0.7		1		
Description	of Filter 18/	ich Lord	٠٠٠		
Samples St	ored and Lock	ed			
Bumpios B.	oron and both				
Back Half/	Moisture				
Liquid Lev	el Marked		Sealed		
y 1.T		Initial Vol		Weight (gra	ms)
Imp. No.	Contents	(ml)	Initial	Final	Net
1	DI HO	100	731-2	777.8	46.6
. 2	11	100	709.6	693.2	-16.4 V.
3			6229	626.1	3,2
4	56,	250	828.0	842.9	14,9
5	-0,		1000		:
6					
F	rotal .		 		48,3
			<u> </u>		1010
Description	of Impinger (Catch:Clo	idz		
T	1		7		

Kalla los

Probe Length/Type: 3F4 Pitot#: Stack Diameter: 4" As: Plant: Scott Air Force Bose Sample Type: Mothod & Operator: my 7.7 CO2: Sampling Location: Generate 25% 6.4 Run Number: 25.2 Date: 9-9-03
Pretest Leak Rate: 00 cfm @14 in.Hg. Pretest Leak Check: Pitot: Corsat:

Nozzle ID: O.183 Thermocouple #:

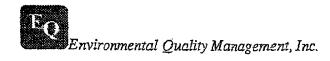
Assumed Bws: Filter #: Pcoa6

Meter Box #: 7 Y: Loo6 AH@: 1.63/

Post-Test Leak Rate: oct cfm @ 19 in.Hg.

Post-Test Leak Check: Pitot: Orsat:

																									•	721
(in. Hg)		N	3	Ŋ	9	2	‰	14	81	6)	61	61	19													1
Outlet		72	73	16	ħC	75	26	96	22	86	28	26	79												`	2
Inlet		か と	28	80	28	83	18	85	85	18	83	82	رج 8													Tm = 28
Temp. °P		22	2.6	57	23	8.6	90	ی ه	28	2.8	19	62	h9													
Filter		050	253	251	BAC	250	250	150	249	250	250	250	055													
Probe		250		249		250	250	348	250	250	032	150	OSC													231
Temp (Ts)		523	523	523	523	523	523	503	523	573	523	523	523													Ts = S
Actual		9.1	9-1	9.1	9-1	9-1	1.6	(.7	1.7	1.7	1.7	1.7	1.7													549.1
Desired		9.)	1.6	9.1	9.1	9-1	1.6	1.7	1.7	1.7	1.7	1.7	1.7												/	= HV 80
Head		70.2	2.01	2.01	70.0	70.€	2.01	10°C	h1.C	2.14	7.14	7.14	2.14													10/ H-1 = 40/
Reading	521.885	9.14S	1.345	548.5	552.1	5.55.3	8.855	5.295	8.595	2.69.8	573.2	8.965	5.085													
E III	+-	58:30	58:35	0h:35	34:45	08:80	-		50:01	10.10	10:15	05:01	50:01													271.CH = MVA
Time	0	<u> </u> .	1					١.		رک			 													΄ Φ
Point Number	0	1																								
	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp. Probe Filter Temp.	Time I lime Reading Head Desired Actual Temp (TS) Probe Filter I limp. Provider Temp. Probe Filter Temp. Provid	Time Reading Head Desired Actual Temp (TS) Probe Filter Temp. 9 Inlet Outlet C 09:25 578-125	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp, 9F Inlet Outlet C 09:25 578-125	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp. or Inlet Outlet C 09:25 S78-125	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp, 9F Inlet Outlet O 09:25 S78.125 S 69:30 S41.6 2.01 1.6 1.6 S23 250 250 6 74 72 10 05:35 S45.1 2.01 1.6 1.6 523 260 253 56 79 73 15 09:40 S48.5 2.01 1.6 1.6 523 250 249 251 57 80 74 20 05:45 S52.1 2.01 1.6 1.6 523 250 249 57 82 74	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp of Inlet Outlet C 09:25 S78-125 S 69:30 S41.6 2.01 .6 .6 S23 250 250 C 74 72 10 05:35 S45.1 2.01 .6 1.6 S23 260 253 S6 79 73 15 07:40 S45.5 2.01 .6 1.6 S23 250 249 S7 80 74 20 07:45 S52.1 2.01 .6 1.6 S23 250 249 S7 82 74 20 07:45 S53.3 2.01 .6 1.6 S23 250 250 S7 83 75 25 07:50 S55.3 2.01 .6 1.6 S23 250 250 S7 83 75	Time Reading Head Desired Actual Temp (Ts) Probe Filter Temp, 9F Inlet Outlet S 69:35 S78-125	Time Reading Head Desired Actual Temp(Ts) Probe Filter Timpung Inlet Outlet O 09:25 S 73 S 125 S 69:30 S 41.6	Time Itme Reading Head Desired Actual Temp (Ts) Probe Filter Temp of Inlet Outlet O 09:25 \$58-125 S 69:30 \$546.6 \$3.01 \$1.6 \$1.6 \$523 \$250 \$250 \$6 \$79 \$73 IS 69:40 \$545.1 \$2.01 \$1.6 \$1.6 \$523 \$260 \$253 \$56 \$79 \$73 SO 67:45 \$552.1 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$57 \$80 \$74 20 67:45 \$553.1 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$77 30 67:55 \$58.8 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$77 30 67:55 \$58.8 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$77 30 67:55 \$58.8 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$77 30 67:55 \$58.8 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$77 30 67:55 \$58.8 \$2.01 \$1.6 \$1.6 \$523 \$250 \$279 \$79 \$70 30 67:55 \$58.8 \$2.01 \$1.7 \$1.7 \$523 \$250 \$249 \$77 \$77 40 10:05 \$562.3 \$2.14 \$1.7 \$1.7 \$523 \$250 \$249 \$78 \$77 40 10:05 \$565.9 \$2.14 \$1.7 \$1.7 \$523 \$250 \$249 \$78 \$77	Time I IIII Reading Head Desired Actual Temp (Ts) Probe Filter Inform. 97 Inlet Outlet O 09:25 \$78.125 S 69:30 \$541.6	Time I meding Head Desired Actual Temp (Ts) Probe Filter Impurery Indice Outlet O 09:25 \$78.125 S 69:30 \$541.6	Time Item Reading Head Desired Actual Temp (Ts) Probe Filter Temp.	Time IIII Reading Head Desired Actual Temp (TS) Probe Filter IIIII IIII IIII Outlet O 09:25 \$78.125	Time Neading Head Desired Actual Temp (Ts) Probe Filter Temp, 194 Inlet Outlet	Time time Reading Head Desired Actual Temp(Ts) Probe Filter Temp. 79 Inter Outlet O 09:25 \$78.135 See 135 See	Time Itme Reading Head Desired Actual Temp (Ts) Probe Filter Improved Intermpted Signature Actual Temp (Ts) Signature Intermpted Signat	Time 1100 Reading Head Desired Actual Temp (TS) Probe Filter 1500 Co. C. C. C. C. C. C. C. C. C. C. C. C. C.	Time Reading Head Desired Actual Temp (Ts) Probe Filter Interpretary I	Time time Reacting Head Desired Actual TempO(Ts) Probe Filter Temporal TempO(Ts) S S S S S S S S S S S S S S S S S S S	Time time Results Head Desired Actual Temp(Tb) Protes Filter Timps out to 09:05 \$78.105 S 67:30 S 78.105 S 67:30 S 74.6 D. 0. 0 1.6 1.6 5.23 D 50 D 50 1.6 7.4 7.2 10 06:35 S 45.1 D. 0. 0 1.6 1.6 5.23 D 50 D 50 1.6 7.4 10 06:35 S 45.1 D. 0. 0 1.6 1.6 5.23 D 50 D 50 1.6 1.6 1.6 5.23 D 50 D 50 20 07:45 S 52.1 D. 0. 0 1.6 1.6 5.23 D 50 D 50 1.6 1.	Time time Reading Hand Desired Actual Trappling Index Outlet O 09:25 578 - 125 S 68:30 S 44 1.6 1.6 1.6 5.23 2.50 2.53 5.6 7.7 3 S 68:40 S 49:5 7.01 1.6 1.6 5.23 2.50 2.53 5.6 7.7 3 S 68:40 S 49:5 7.01 1.6 1.6 5.23 2.50 2.53 5.6 7.7 3 S 68:40 S 49:5 7.01 1.6 1.6 5.23 2.50 2.50 5.9 8.3 7.5 S 68:50 S 55.3 3.01 1.6 1.6 5.23 2.50 2.50 5.9 8.9 7.5 S 68:50 S 56.2.3 2.04 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.6 S 70:00 S 62.2.3 2.14 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.7 S 10:00 S 62.2.3 2.14 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.7 S 10:05 S 62.2 2.14 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.7 S 10:05 S 62.2 2.14 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.7 S 10:05 S 62.3 2.14 1.7 1.7 5.23 2.50 2.50 5.9 8.9 7.7 S 10:05 S 7 8 8 7 7 8 8	Time time Reading Had Desired Actual Trange Filter Transporter Courses O 09:25 578-125 S 69:30 S 41.6	Time 1 1000 10	Time time Raduling Hand Desired Actual Tranp (Th) Proba Filler Tranp The S 67:30 S 78. 125 S 67:30 S 41.6 S 5 3 S 5 0 S 5 0 S 5 0 S 67:30 S 41.6 S 5 3 S 5 0 S 5 0 S 5 0 S 67:30 S 41.6 S 5 3 S 5 0 S 5 0 S 5 0 S 67:30 S 5 6 1 S 5 0 S 6 0 S 7 0 S 67:30 S 5 6 1 S 5 0 S 6 0 S 7 0 S 7 6 10 10 S 5 6 1 S 7 0 S 7 0 S 8 7 7 7 S 7 0 S 7 0 S 8 8 7 7 7 S 7 0 S 7 0 S 8 8 8 7 7 0 S 9 10 10 10 S 6 1 S 7 0 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 S 6 1 S 7 0 S 10 10 10 10 S 10 10 10 S 7 0 S 10 1	Time Neading Head Decend Article Probe Filter Time Tim



Plant _>	wH 11713			Run No.	25-5-6
Date 9/9	103	Sample Box No.	H 5B-4	Job No.	PC 026
Sample Lo	ocation General	der Exhaust - L	oadin 25%	Filter No/	PC026
TT . 10					
Sample Re	covery Person	<u>5</u> A			
Comments	3				
Front Half	•				
		Limid			
Container	Ñο	Liquid Level Marked	Sealed		
Communica	110.	LOVOI MIMIROU	Boaled		
Filter					
Container	No		Sealed		
					•
Description	n of Filter				
Samples S	tored and Locks	ed			
Back Half	Moisture.				

Liquid Lev	el Marked		Sealed		
Ymm No	Contanto	Initial Vol		Weight (gra	ms)
Imp. No.	Contents	(ml)	Initial	Final	Net
1	DI Kno	100	710,0	722.1	12.1
. 2	DIHO	(00.	716.B	729.8	13,0 V
3		-	6215	623,4	1.9
4	silver bel	250	869,0	886.8	17,8
5		1 2 3 2			
6 .					
F	rotal				44,0
					<u> </u>

Description of Impinger Catch: Cloudy

Thes

Plant: Scoft A: Force Base Sample Type: Method S Operator: 15 Ps. 4 Phar. 25% Lod Phar. 30-6? Ps. 4 Pretest Leak Rate: 25-3 Date: 9-9-03 Probe Length/Type: 3 Ft. Pitot#: Stack Diameter: As: As: 15.5

\\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	Nozzle ID: O. 183 Thermocouple #:	Assumed Bws: Filter #: 830556	Meter Box #: 72 Y: 1.006 AH@: 1.631	Post-Test Leak Rate: . oo9 cfm @ / in.Hg.	Post-Test Leak Check: Pitot: Orsat:
А І А ЭПЕБІ	ator:	6.	15.5	4. Pitot#:	As:

																 -		r		_	·	 	,		,	3/8
Pump Vacuum	(in. Hg)		_	-	1	_	1	_	,	_	~	ļ	1	1												<u> </u>
r Temp. Tm	Outlet		80	18	87	82	83	48	85	85	98	98	87	28											/	-
Dry Gas Meter Temp. Tm	Inlet		18	85	90	92	hb	hЬ	26	95	96	96	96	96												<u>Tm = 88</u>
Impineer	Тетр. ° Е		62	55	27	55	95	حري	22	55	9.5	25	2_8	2.5												\vec{I}
ure °F	Filter		282	252	249	251	250	150	250	250	5hC	6hC	250	250										ļ		
Temperature °F	Probe		251	250	250	251	249	546	250	250	250	152	250	250							-					7
Stack	Temp (Ts)		523	250	کری			225	253	552	552	353	552		-											Ts = 549
1 1	Actual		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	(-)	1.7	1.7											,	1.71
Нδ	Desired		1.7	(1)	1.7	4.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7											14577C	1.46/H/=
Velocity	Head		2.14	₽1.C	7.14	2.14	7.14	2.14	2.14	2.1	2	7.	2.1	2.												2
Gas Meter	Reading	580.152	4.48	588.2	591.9	5.5.5	577.3	602.9	9.909	610.3	1.419	617.7	4.159	625.175												= dV/ 25ch.
Clock	<u> </u>	7h:01	10:41	10:52		ļ		 	11:17	11:22	1:27	 	11:37	7.43 I			-									ΔVm = 44. 433
Sampling	Time	0		0/	15	20	25	30	35	95	45		25	09												`⊄
Traverse	Number	0	_																٠.							



Plant Sc	of AFC	3		Run No. 25	330556
Date 9/9/	107	Sample Box No. J	HSB-3	Job No.	
Sample Lo	ocation General	er Exhaust -	Loading 25%	Filter No.	330556
	aier S				
Sample Re	covery Person_	DA			
Comments					
Front Half					
Acetone		Liquid			
Container		Level Marked	Sealed		
Filter					
Container :	No		Sealed		
Description	n of Filter	ach boaday	·		
		d			
Back Half/ Container					
Liquid Lev	el Marked		Sealed		
T No	Contract	Initial Vol	T	Weight (gran	ns)
Imp. No.	Contents	(ml)	Initial	Final	Net
1	DE tho	100	724.9	8/4.3	8941
. 2	c)	100	719.2	667-7	-51.5 V
3			6/0.3	610.1	-0,2 V
4	S G.,	250	826-6	8406	140
5			020-0		1100
6 .					
7	Cotal				51.7
Description	of Impinger Ca	itch: Clord	7		

1x malubos



GAS VELOCITY AND VOLUMETRIC FLOW RATE

	Plant:	Scott	MIC	Date: 9/103
	Sampling I	ocation: ~	Ble Geve	rater Outlet Clock Time.
	Run #:	50-1: 50	ンース	Operators: PL/TG
	Barometric	Pressure, in.l	Hg: 30	Operators: PL/T6 Static Pressure, in.H ₂ O:
	Moisture,	%: <u> </u>	Molec	ular wt., Dry: Pitot Tube, Cp: D ??
	Stack Dim	ension, in. Dia	ameter or S	ular wt., Dry:Pitot Tube, Cp:9 ide 1:3" Side 2:
	Wet Bulb,	°F:		Dry Bulb, °F:
	Pitot #		Therm	_ Dry Bulb, °F: ocouple #
1	- T			(0.44 g 0.0-) . (0.20 g 0.) . (0.20 g N.)
	Traverse	-		$Md = (0.44 \times \% CO2) + (0.32 \times \% O2) + (0.28 \times \% N2)$ $Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$ $Md = 27.4$ $+ 3.5$
50% setting	Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
	Number	in H ₂ O	Temp,°	Md = 29.4 + 3.5
1-1:4:23				$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$
()00017	1	7,8		$Ms = Md \times (1 - \frac{1}{100}) + 18(\frac{1}{100})$
0 1	2	70	617	
Run 1 1154- 1200		137,3		$Ms = () \times \left(1 - \frac{100}{100}\right) + 18\left(\frac{1}{100}\right)$
.164-	4	7.4.	619	Ms = 28,94
1121	<u> </u>	Tole	GI	$\frac{10.5}{T_5} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
1200	L.	Te.4	614	
, -	ì	7.8	647	$Ps = Pb + \frac{S.P.}{} = ($ $) + {}$
	2	7.60	613	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
•	ን	7.4	619	Ps = 30,95in Hg
	¥	7.1		$\sqrt{\overline{\Lambda P}} =$
	5	6.9	615	·
Aun 2 1317-	l _a	6.7	613	$V_{S} = 85.49 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}(R)}{P_{S} \times M_{S}}}$
		10.9	1	·
Run 2	2	7.1	617	$Vs = 8549 \times () \times () \times $
12.11	3	7.4	620	Vs = 247.4 ft 1s
1511	· · ·	7.5	621	
•	}	7.4	621	As = ft ² /39.1 4/5
	i.	73	6/9	$ Qs = Vs \times As \times 60$
	1	6.9	1.14	$\varrho_{s} = \times \times 60 \qquad 92.81$
	2	1.4	7.13	$Qs = \times \times \times 60$ $Qs = 728 \text{ Gacfm} \qquad \Delta V = 2.25$
	3	7.5-	616	Qs = 728, Gacfm AB = 2.23
	\ \u00e4	77	9.10	$O_{S,u} = O_S \times 17.647 \times \frac{P_S}{100} \times \left(1 - \frac{\% H_2 O}{100}\right)$
	1	3.5	1613	Ts (100) +2 5 "
	1	71	608	$Qs = 128, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
	- Le	/·/	T 600	
	L	1/AP - 711e	T- 114	$Qs_{sid} = dscfm$
		JAP = 2, US	_	
	47	2.687	617	

\\HAWK\ADMIN\Air Testing\Forms\Field Data Sheets\Gas Velocity and Volumetric Flow Rate doc



GAS VELOCITY AND VOLUMETRIC FLOW RATE

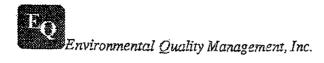
			Y AND VOLUMETRIC FLOW RATE
Plant:	Scott	AF(B Date:
~ ·· ·			
Run #-	Location: Crushitia	3 Ru	Operators: PK/TG
Rarometric	Pressure in I	i de	Static Pressure, in.H ₂ O:
Moisture (\mathcal{I}_{∞} .	Moleci	ular wt Dry: Pitot Tube Cn: 0,99
Stack Dim	ension in Dia	meter or S	ular wt., Dry: Pitot Tube, Cp: 0.99 ide 1: Side 2:
Wet Bulb	°F.		Dry Bulb, °F:
Pitot #	*	Therm	ocouple #
		1 10111.	occupio ii
Traverse	Velocity		$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
Number	in.H ₂ O	Temp,°	
			Md = 29.4
7	73	1013	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ $4 + 40$
L	7.4	117	+ 404
7	ラ ラ	61/	$M_{s} = () \times (1 - \frac{100}{100}) + 18(\frac{100}{100})$
Ÿ	7/	618	(100) (120)
5	7.5	118	$Ms = \lambda 8.94$
- [73	615	$\overline{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
	7.0	614	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
2	7.3	1213	** *
5	7.5	6.5	Ps = 30.98 in Hg
Y	74	9.10	$\sqrt{\overline{\Delta P}} =$
\$	54	614	['
(a	73	614	$V_{s} = 8549 \times C_{p} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{s}(^{\circ}R)}{P_{s} \times M_{s}}}$
			[
			$Vs = 85.49 \times () \times () \times $
			Vs = 2 52,0 ft / s
			$As = ft^2$
			$Qs = Vs \times As \times 60$
			$Q_s = \times \times 60$
			$Qs = 742 \left(acfm \right)$
			$Qs_{std} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2O}{100}\right)$ $Qs_{std} = \times 17647 \times \dots \times \left(1 - \frac{100}{100}\right)$
			0 = ×17647×
			100
			0/0.2
	$\sqrt{\Delta P} = 2.72$	Ts = 1015	$Qs_{sid} = 362, \lambda dscfm$
	10 7 30		1
Ave	20P 7,39		

1431-

Probe Length/Type: 3 Ft Pitot#: Plant: Scott Air Force Bose Sample Type: wether S Operator: Stack Diameter: CO₂: Pretest Leak Rate: •002cfm @ 14 in.Hg.
Pretest Leak Check: Pitot: ___Orsat: ___ Sampling Location: Generate So Run Number: SO-1 Date: 9-8-63

Orsat: Nozzle ID: 0.183 Thermocouple #:
Assumed Bws: Filter #: 836557Meter Box #: 7Post-Test Leak Rate: .ool cfm @ Post-Test Leak Check: Pitot:

																				 _	
Pump	(in. Hg)		_	1	1		_	_	1	1	1	_	,	_						7	9)
er Temp. Tm	Outlet		87	62	67	28	28	28	67	80	88	88	88	600							
Dry Gas Meter Temp. Tm	Inlet		& &	9.0	ી છે	93	hb	hЬ	95	56	56	96	96	66							Tm = 93
Tabunger	Temp. °F		73	09	26	£3	53	23	st.	حرير	24	کری	کاک	26							
ture ° F	Filter		253	754	250	osc	250	250	250	250	250	250	250	150							
Temperature °F	Probe		250	250	122	250	346	248	250	250	249	250	8hC	150							なり
Stack	Temp (Ts)		253	552	255	255	219	215	617	219	617	219	219	419						,	TS = 27
7.	Actual		1.7	(.7	1.1	('1	1.6	9.1	1.6	1.6	1.6	1.7	1.7	1.7							1.86 1
Нα	Desired		1.7	1.7	1.7	1.7	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7						\	= 4830 AH =
Velocity	Head		٦٠١	2.1	2.1	2.1	2.25	2.25	2.25	2.25	2.25	2.25	Sc.C	7.25							· '
Gas Meter	Reading	625.532	629.2	633.1	9.989	640.3	0.443	9.649.6	651.2	L.h.59	2.859	0.699	665.7	9Eh-699						/	3.904V JAp =
Clock	2	55:11	12:00	12:05	12:10	اع: رک		32:01	08:21	12:35	oh: 21		05:51	\SS :CI							43.404v
Sampling	Time	0	بها	0/	15	20	25	30	38	0h	sh	8	55	09							٥
Traverse	Number	0																			



Sample Re	arer <u>D4</u> covery Person				0-5-1
Front Half					
Acetone		Liquid			
Container]	No	Level Marked _	Sealed		
Filter					
Container !	No		Sealed		
Samples St	ored and Locke <u>Moisture</u>	ed			
Liquid Lev	el Marked		Sealed		
Imp. No.	Contents	Initial Vol		Weight (gra	
		(ml)	Initial	Final	Net
1	DITHO	100	730-6	800.1	69.5 V.
2	. γ	100.	708.3	678,8	-29.5 V
3	->		623.0	623.5	0,5 1
4	50	7.50	842-9	852.5	9.6
5					
6					
I	'otal				50,1 V

Description of Impinger Catch: Cloudy



 CO_2 : $\frac{4}{4}$ $\frac{9}{4}$ O_2 : $\frac{1}{2}$ $\frac{1}{4}$ $\frac{2}{4}$ Pitot#: Kim Plant: Scott A: Force Base Sample Type: Methal & Operator: W) Stack Diameter: CO2: 4, 9 Sampling Location: Generater Sol Lood Run Number: <u>SO-2</u> Date: <u>タッヤーの3</u> Pretest Leak Rate: -co2 cfm @14 in.Hg. Pretest Leak Check: Pitot: Corsat:

Nozzle ID: 0.120 Thermocouple #:

Assumed Bws: Filter #: 0.006 AH@: 0.63Meter Box #: 0.006 AH@: 0.006 AH@: 0.006Post-Test Leak Rate: 0.006 or in.Hg.

																				2	Eo X	19/16
Pump	(in. Hg)		1	1	į	6	カC	35	25	250	20	25	52	25								
er Temp. Tm	Outlet		68	88	68	68	68	68	89	68	88	88	88	8.8								
Dry Gas Meter Temp. Tm	Inlet		16	92	16	16	16	16	90	68	87	88	858	88								7m = 60
Impinger	Temp. °F		62	99	99	59	59	59	99	99	99	99	99	67								
ture °F	Filter		95 C	252	248	250	150	230	150	250	250	253	052	05C								
Temperature °F	Probe		LHC	348	250	249	250	230	a50	251	256	052	280	250							•	7
Stack	Temp (Ts)		617	617	617	617	617	617	419	617	617	617	617	617								$\overline{Ts} = 61$
ν	Actual		0.3	0.3(0.3(0.3/	0.31	0.3/	20.0	C.02	10.0	10,0	0,01	10.0								AH = 0.162V
٥	Desired		0.31	0.31	0.31	0.31	0.31	0.31	0.02	600	19.0	10.0	0,0,0	6.01							•	× ×
Velocity	Head		2.25	2.25	2.25	2.25	2.25	2.25	SC.	7.25	2.28	2,25	2.25	2.25								JAP = 1.5000
Gas Meter	Reading	669.896	9.169	673.2	674.8	676.2	677.3	678.1	4.869	678.8	679.1	679.43	679.66	678.892								
Clock		13:10	13:15	13:20		13:30	13:35	0h : El		13:50		14:00	14:02 (14:10								1 9 6 . 9 m V A
Sampling	Time	0	8	01	151	20	5e	95		0h		20	5.3	09								٩
Traverse	Number	0																				



200 <u>0006.</u> 007
,
Net
2, 7
5,7
3 1
/
> V



Sample Type: Method S Operator: 100 CO₂: $\frac{4.7}{14.5}$ O₂: $\frac{14.5}{14.5}$ Probe Length/Type: $\frac{3Ft}{14.5}$ Pitot#: Stack Diameter: As: Pbar: 30.69 CO₂: 4.7 Sampling Location: Generater 567 Lond
Run Number: 56-3 Date: 9-8-03
Pretest Leak Rate: 203cfm @ 12 in.Hg.
Pretest Leak Check: Pitot: Corsat: Plant: Scott Air Force Base

Nozzle ID: 0.185 Thermocouple #:
Assumed Bws: Filter #: 830558
Meter Box #: 7 Y: 1.006 AH@: 1.63
Post-Test Leak Rate: 606cfm @ A in.Hg.
Post-Test Leak Check: Pitot: Orsat: ______

			1	т	 	1	·]	.	ı —					1	· · · · ·		 	-,	 	 	 	و کِ	7
Pump	vacuom (in. Hg)		-	-	_	_	な	ん	7	("	K	R	ત્ય	ره									7	5
Dry Gas Meter Temp. Tm	Outlet		23	00	& &	80	88	90	%	16	82	92	92	42								,	1/5	-
	Inlet		& &	16	95	88	901	101	101	101	101	<i>Jo)</i>	101	101									Tm = 96	7
Imminger	Temp. °F		99	65	99	29	22	82	85	26	20	09	Ę,	09										
nture ° F	Filter		230	734	230	230	JEC	230	230	230	230	230	230	230										
Temperature °F	Probe		tet	233	230	230	230	188	735	180	230	230	230	186									200	
Stack	Temp (Ts)		009	069	059	029	620	009	620	620	620	620	620	620								\	$\sqrt{T_S} = 6$	
ЬΔ	Actual		1.6	9.1	9.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7									1-675	
7	Desired		1.6.	9.1	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7								/	$=\frac{H\nabla}{\sqrt{\Omega}}$	
Velocity	Head		2.05	2,25	2.25	2.25	2.25	2.25	2,25	2.25	2,25	2.25	2.25	2.25									= 1.500 7.254	} }
Gas Meter	Reading	680.027	683.6	687.2	680.9	684.7	4.839	702.1	705.9	708.7	713.4	717.1	720.9	724.650									- dDJ 623	
Clock	3	hc:3/	14:29	14: 34	14:39	भि: पेर्म	14:49	14:24	14:5%	ho:51	18:01	h! - S)	15:19	ነኝ፥ ኃዛ									ΔVm=44.623	
Sampling	Time		S	0)	15	20	25	30		40	ì	50	کک	09									10	
Traverse	Number	0	1																					



Environmental Quality Management, Inc.

SAMPLE RECOVERY DATA

Plant Scanner 9/0	21+ AFB	Sample Box No &rhart- Loud	HSB-3	Rm No. <u>50</u> Job No. <u>030</u>	-5-3 <u>174.006.0</u> 02 30558
Sample Lo	cation <u>because</u>	exhast-local	50 %	Futer No b	20530
Train Prepa	orman Dozgon	DD .			
Commons					
Front Half					
Acetone		Liquid			
Container l	No	Level Marked	Sealed		
Filter	NT.		Caalad		
Container !	No		Sealed		
Description	n of Filter <u>B</u>	Le			
Samples St	ored and Locke	ed			
Back Half/	Moisture				
Liquid Lev	rel Marked		Sealed		
		·			
Imp. No.	Contents	Initial Vol		Weight (gran	
		(ml)	Initial	Final	Net
1	DD tho	600	732/6	801.0	66.2 V
- 2	11	100	713.8	6841	-29.7 V
3			609.9	611.0	11
4	56	250	8406	849.4	8,8
5					
6					
	Total		<u> </u>		46,4 1

Description of Impinger Catch: Closely

Ky.



GAS VELOCITY AND VOLUMETRIC FLOW RATE

	Plant:	SANT	AFB	Date: 9/9/03
	Sampling I	ocation:	8/0 B	Operators: PK/16 Operators: PK/16 Old 9 Static Pressure, in.H ₂ O: Pitot Tube Co: 0 69
	Run #	Condita	m 4	Operators: RM 16
	Rarometric	Pressure in I	Ho. 3	O 69 Static Pressure in H ₂ O:
	Moisture. 9	%·	Moleci	ular wt., Dry: Pitot Tube, Cp: 0, 99
	Stack Dime	ension, in. Dia	meter or S	ide 1: Side 2:
				Dry Bulb, °F:
				ocouple #
			<u> </u>	
	Traverse	Velocity		$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
	Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
11.1.	Number	in.H ₂ O	Temp,°	Md =
1605-		_		(5 Ha) (5 Ha) / Az AE =
11-10		7,9	733	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ & Auxil = 5.0%
W	2	6.1	746	5.0
	3	8.2	741	$Ms = () \times (1 - \frac{100}{100}) + 18(\frac{100}{100})$
	4	7.7	751	Mc- 10.1
	5	7.5	752	$Ms = 20.1$ $\overline{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
	6	7.5	750	Is = F = K(F + 400)
		8.3	750	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
	2	8.0	755	13.6 13.6
	3	8.1	755	Ps = 31.06 in Hg 151.1
	4	8,0	752	$1\sqrt{\Delta P} =$
	5	7.4	752	$= \sqrt{T_s(R)} 96.3$
Sixa 4	6	6.9	75/	$V_{s} = 85.49 \times C_{p} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{s}(^{\circ}R)}{P_{s} \times M_{s}}}$
	j	8.3	7 47	Vs = 85 49 ×()×()× ₁
Lu Z	2	8.4	747	i ¥
ru	4	8.5	750] vs = 268.8 ft/s Static =
01-	4 5	8.	747	Vs = 268.8 ft / s As = ft ² 4.54
	3	7.8	793	<u>.</u>
	L	7,7	742	$Qs = \forall s \times As \times 60$
		8.0	746	$Q_s = \times \times 60$
	2	8,/	748	Qs = 79/.7acfm
	3	0 -	748	Ps (%H,O)
	4	8.0	747	$Qs_{sid} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2O}{100}\right)$
	5	7.9	745	$Qs_{sid} = \times 17.647 \times \cdots \times \left(1 - \frac{100}{100}\right)$
	6	7.6	744	100 /
			<u> </u>	02144 draft
		VAP = 2.79	Ts = 750	$2^{2s_{sid}} = 344.4 dscfm$
		7.8) 46 5p

\\HAWK\ADMIN\Air Testing\Forms\Field Data Sheets\Gas Velocity and Volumetric Flow Rate doc

Environmental Quality Management, Inc.

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant:	Sw1 1	4FB		Date:	9/5/	3
Sampling 1	Location: — 1	Ble beve	rentor Extrant	Clock T	ime:	
Run #:	Constitu	4, Ru	Operato	rs:	RK/TI	<i>6</i>
Barometrio	Pressure, in.l	Hg: 30.	Static P	ressure, in	.H ₂ O:	
Moisture,	%: <u> </u>	Molec	cular wt., Dry:	_Pitot Tu	be, Cp:/	2,99
Stack Dim	ension, in. Dia	ameter or S	cular wt., Dry:	Side 2:	•	
			_ Dry Bulb, °F:			
			nocouple #		_	
			•			
Traverse	Velocity		$ Md = (0.44 \times \% CO_2) + (0.32) $	×% 02)+(0.	28×% N 2)	
Doint	Trand		$Md = (0.44 \times) \pm (0.3)$			

Moisture,	%: <u> </u>	Molec	cular wt., Dry: Pitot Tube, Cp: 0,99
Stack Dime	ension, in. Di	ameter or S	Side 1:
Pitot #		Therm	Dry Bulb, °F:
		,	7 () () (
Traverse	Velocity		$\int Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
Number	in.H ₂ O	Temp,°	Md =
	for all	F	$M_{2} = M_{2} (1 + 8H_{2}0) \cdot 10 (8H_{2}0)$
	6,4	739	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right) \qquad \text{Sfute} = 4\%.5$
1	<u> </u>	738	$Ms = () \times \left(1 - \frac{100}{100}\right) + 18\left(\frac{100}{100}\right)$
3	0,3	770	1 (100)
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ 	6.2	700	Ms =
	79	747	$\sqrt{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
4	8.3	740	have Bt. S.P (
2	B.Z	745	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
3	8.1	746	Ps = in Hg
li li	8./	746	$\sqrt{\Delta P} =$
5	8,0	746	
<u></u>	78	745	$V_{S} = 85.49 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}(^{\circ}R)}{P_{S} \times M_{S}}}$
		<u> </u>	$\begin{cases} V_s = 8549 \times () \times () \times \end{cases}$
			-1 $Vs = ft / s$
			$As = ft^2$
			J .
		ļ	$Qs = Vs \times As \times 60$
			$Qs = \times \times 60$
			Qs = acfm
		·	$Qs_{sid} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2 O}{100}\right)$
			$Qs_{std} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2 O}{100}\right)$ $Qs_{std} = \times 17647 \times \cdots \times \left(1 - \frac{100}{100}\right)$
			`
I	√ <u>∆</u> P =	$\overline{Ts} =$	$Qs_{sid} = dscfm$
Į.			لـ

Plant: Scott A: Force Besc Sample Type: Methol S Operator: ord Sampling Location: Generator -75% Long Phar: 30.69 Ps. 75.0

Run Number: 25-1 Date: 9-1-03

Protest Leak Rate: 2001 cfm @ 14 in.Hg. Probe Length/Type: 3 Ft. Pitot#: As: Stack Diameter: _ Plant: Scott A: 1 Free Bose Pretest Leak Rate: .col cfm @ 14 in.Hg. Pretest Leak Check: Pitot: __Orsat: __

Nozzle ID: Thermocouple #:

Assumed Bws: Filter #: $\overrightarrow{8305\$}$ Meter Box #: $\overrightarrow{7}$ Y: $\overrightarrow{1.006}$ \triangle H@: $\overrightarrow{1.6}$ \$

Post-Test Leak Rate: $\cancel{1.003}$ cfm @ $\cancel{2}$ in.Hg.

Post-Test Leak Check: Pitot: Orsat:

/acuum	Hg)		ابہ	7	צו	K	20	~	.^	\sim	- 4	00	0.0		 					X	Y
1	(in. Hg)		ሌ	6	14	10	IA)	(*)			(C)	ני)	(s)	(2)				_			
Dry Gus Meter Temp. Till	Ourlet			93	22	92	92	92	92	93	93	93	88	93							7
ory das met	Inlet		44	95	3.6	86	99	100	00)	001	100	100	001	100							$\overline{Tm} = 95$
Impinger	Temp. °F		63	63	99	65	63		29		63	63	63	h9							•••
٦	Filter		232	231	230	230	236	230	230	135	230	08 C	230	230							
i amikiadina	Probe		230	238	246	HHE	1/2	8E C	hEC.	734	hEC.	232	233	230							201
Stack	Temp (Ts)		620	029	620	069	079	620	029	620	620	009	620	620							Ts= 620
	Actual		1.7	1.7	1.7	[,7	1.7	1.7	1.7	1.7	1.7	7:7	1.7	1.7							1.71
PΔ	Desired		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	7.1	1.7	1.7							= HV 000
Velocity	Hend		2.25	2.25	2,25	250.0	2.25	2,25	2.25	2.25	2.25	2.25	2.25	2.25							1.5
Gas Meter	Reading	725.048	728.8	732.4	736.2	739.9	743.6	747.4	751.1	754.9	758.6	762.3	0.996	269.892							- dV/ 18h9.
1 C		15:40	. Sh:S1	. 05:51	ای دی	90:91	 	١.	. 31:91	16:30	-	16:30	<u> </u>	-			-				18h9. hh = m/2
Sampling	Time	0		1		20					Ī			Г							۵
T I I VCI SC	Point Number	0	,_																		



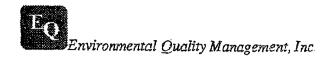
Plant Sc	of AFB			Run No	5-5-1	
Date 9/	9/03	Sample Box No. 1	TSB-1	Job No		
Sample Loc	cation Gynerate	r Rahaust - Lo	adin 75%	Filter No.	330559	
Sample Rec	covery Person_	124				
Front Half						
Acetone	_	Liquid	0 1 1			
Container I	No	Level Marked	Sealed			
Filter						
	Vo		Sealed			
Description	of Filter	lack - Hec	vy			
T						
Samples St	ored and Locke	d				
Back Half/						
Container l	No					
T 1 . 11 T	132 1. 3		Canlad'			
riding rea	el Marxed		Sealed			
<u> </u>		Y 22 13T. 7		Weight (gra	ime)	
Imp. No.	Contents	Initial Vol	Initial	Final	Net	
	5.0.1.5	(ml)	<u> </u>		not not	
1	DIHO	100	729,8	809-3	19,3	
. 2	प		711.2	679.0	-32.2	V
3			623.1	624.0	0.9	V
4	SG.	250	1843.1	858.3	15,2	
5						
6						
¥	l'otal				(03.4	-
<u></u>				L		
Description	of Impinger C	atch: <u>lo</u>	dy			

Lythe

Probe Length/Type: 374 Pitot#: Sample Type: Methad S Operator: MY 30.69 PS: +5.0 Stack Diameter: 4H Plant: Scott A; Force Bose San Sampling Location: Generator - 75% Look Run Number: 75-3 Date: 9-9-03 Pretest Leak Rate: 200 ofm @ 14 in.Hg.
Pretest Leak Check: Pitot: ___ Orsat: ___

Assumed Bws: Filter #: 000 019
Meter Box #: 7 Y: 1.006 0H@: 1.63 Post-Test Leak Rate: . ood cfm @ 2/ in.Hg. Orsat: Nozzle ID: $O_{\circ}/83$ Thermocouple #: Post-Test Leak Check: Pitot:

)	Z_{i}	15
Pump	(in. Hg)		1	W	23																	
r Temp. Tm	Outlet		92	82	16																	71
Dry Gas Meter Temp. Tm	Inlet		92	44	hb			·														Tm = 93
1000	Temp. °F		99	91	90																	
ure °F	Filter		861	192	172																	
Temperature °F	Probe		111	183	100											,						120 /
Stack	Temp (Ts)		750	250	250																	Ts = 7
_	Actual		1.6	9.1	0,33																	2
Η _Δ	Desired		9"1	9.1	0.33																	140 VH
Velocity	Head		2.46	2	2.46																	VAP = 1, 5684) A
Gas Meter	Reading	769-932	773.9	7.926	303.706																	. 4
Clock	Time	16:52	16:57	17:02	17:07	*Conta																1107 = MAV
Sampling	Time	0		10		20	25	30	35	0h	ط۶	S	عر	09								7
Traverse	Point	O			From	701	test											:				



Plant	10H AFB	Sample Box No.		Run No. 7	5-5-2
Date 9/9	113	Sample Box No.	HSB-4	Job No	5-5-2 20174 0006 002 0019
Sample Lo	ocation Generalis	Exhaut-Le	adin 75%	Filter No. 🔑	C019
Train Prep	arer DA		·		
Sample Re	covery Person	AIRK			
Comments	S				
Front Half	•				
Acetone		Liquid			
Container			Sealed		
Filter					
Container	No		Sealed		
Dii					
Description	n oi filler			•	
Samples S	tored and Locke	d			
Back Half					
Container :	No				
Tionid I or	ral Marilrad		Castad		
ridua rev	CI Marketi		Seated		
Imp. No.	Contents	Initial Vol		Weight (gra	ms)
ттр. 140.	Comens	(ml)	Initial	Final	Net
1	DIHO	100	708,2	751.1	42.9 V
. 2	DIHO	100	718.7	677.7	-41.0 V
3	empty	M	621-6	1020.4	-1.2 V
4	Silve Gel	250	886.4	896.9	10.5 V
5					•
6 .					
·	Fotal				11,2
		<u> </u>	-L		

12/1/2

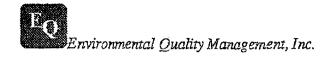
Description of Impinger Catch:

Plant: Sampling Location: Generated -75% Conf Phar: 30.69 Ps: +5.

Run Number: 75-3 Date: 9-9-3 CO2: 6.2 O2: 12.9

Pretest Leak Rate: 400 cfm @ 14 in. Hg. Stack Diameter: As: As:

		XIIIIII	····	,					,			,	,		 -	 			 	 	 		. g
Pump	(in, Hg)		_	/	1	1	1	_	1	+	/	_	-	/								1	X
r Temp. Tm	Outlet		68	83	89	89	89	20	90	90	90	90	16	16									
Dry Gas Meter Temp. Tm	Iniet		89	16	44	96	44	27	86	86	26	86	86	86									Tm = 93
Impinger	Temp. °F		<i>h9</i>	9	09	59	85	8.8	27	57	22	27	57	8.8									
ure °F	Filter		250	250	3A8	153	251	251	250	bh C	250	250	250	150									
Temperature °F	Probe		250	250	250	250	250	250	250	348	250	250	250	150									20 5
Stack	Temp (Ts)		750	750	750	750	750	750	250	OSL	750	750	750	750								/	$T_s = 7$
	Actual		9./	1.6	1.6	1.6	7.6	1.6	9.1	9.1	9.1	9./	9.1	9.1									1-6 V
Нδ	Desired		9-1	1.6	1.6	1.6	1.6	1.6	9.1	1.6	1.6	9.1	9-1	1.6								\ <u></u>	= HV 28 9
Velocity	Head		9h.C	3.46	2.46	-	2.46	9h C	2.46	2.46	2. 4C	3.46	27.6	2.46									7.5
Gas Meter	Reading	728.66	781.5	785.0	9.886	792.2	295.8	799.5	803.0	606.7	810.2	813.8	817.3	820.950									$= d\nabla / hso'$
Clock	2	Sc: 2!	17:30	17:35 -	. oh:(1	. Sh:41	05:41	ا ٤٠ در	00:81	17:05	18:10	51:81	18:30	8 50:11			-						43,054v
Sampling	Time	0	h		15	20	150	30	35	70	٨٧	20	55	90			1						`∇
Traverse	Number	0																					



Date 9/1 Sample Lo Train Prep Sample Re	arer DA	Sample Box No. by Extenst- DA				
Front Half Acetone Container		Liquid Level Marked	Sealed			
	No		Sealed			
Description	n of Filter <u>Ha</u>	ay Black				
		/ ed				•
Back Half/ Container	Moisture No.					
Liquid Lev	el Marked		Sealed			
T NT-	Company	Initial Vol		Weight (gra	ms)	
Imp. No.	Contents	(mI)	Initial	Final	Net	7
1	DIHO	(00	729.4	810.6	81.2	V
2	1)	100	718.3	682-7	-35-6	
3			609.9	610.6	0.7	V
4	5G-	250	840.5	855-3	14.8	
5					·	
6						
•	Total				61-1	V
Description	of Impinger C	eatch: Cloudy				

Harlin



GAS VELOCITY AND VOLUMETRIC FLOW RATE

	Plant: (Scott 1	4FB	Date: 9/13/0 3
	Sampling I	ocation:	Ble her	water Fxfrage Clock Time:
	Drin # /	Constition	5 Purs	Operators: RK/TG
				Chatia Decourse in U.():
	Moisture %	h. le	Moleci	ular wt., Dry: Pitot Tube, Cp: 0.99 ide 1: 3" Side 2:
	Stack Dime	nsion in Dia	meter or S	ide 1: 3" Side 2:
	Wet Bulh	F:		Dry Bulb, °F:
	Pitot #	^ ·	Therm	ocouple #
				
[Traverse	Velocity		$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
ļ	Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
15 as	Number	in.H ₂ O	Temp,°	$Md = + UD^{4}$
Julina 5		_	F	$Md = Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ $M = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ $M = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$
Real	1	8.1	653	$Ms = Md \times \left(1 - \frac{100}{100}\right) + 18\left(\frac{1}{100}\right)$
0	2	7.9	664] // // // // // // // // // // // // //
R-1	3	7.8	1.1.5	$MS = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1$
0835	¥	7.8	ble	$Ms = () \times (1 - \frac{100}{100}) + 18(\frac{1}{100}) $ $Ms = 28.92$ $Ts = °F = °R(°F + 460)$ $Ps = Pb + \frac{S.P.}{13.6} = () + \frac{1}{13.6}$ $Ps = 20.976$ $Ms = 28.92$ $Ps = 20.976$
DAP (5	7.6	666e	m op of the theol
	G	7.6	664	$\begin{cases} Is = P = N(I + 400) \end{cases}$
	1	7,6	652	$Ps = Pb + \frac{S.P.}{S.P.} = () + \frac{1}{100}$
	2	7,9	654	13.6 13.6
	3	8.0	6,60	Ps = 30,97in Hg
	4	8.0	662	$\sqrt{\Lambda P} =$
	5	7,9	663	$Ts(\circ R)$
•	4	7,9	663	$V_{S} = 85.49 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}(^{\circ}R)}{P_{S} \times M_{S}}}$
_	-	7.6	680	$V_s = 85.49 \times () \times () \times $
Cendidin's	2	7,7	685	Y Y
C 6 Mar a	7	7.5	684	Vs = 264.4 #15
Rin +	ч	6.5	682	$As = ft^2$
	5	6.0	6.80	(
Rm ² 1000	le	10.7	683	$Qs = Vs \times As \times 60$
<i>i</i> –1		7.4	687	$O_s = \times \times 60$
100 /	2	7.3	6.87	Qs = 780, 3 acfm
•	3	7.2	685	$Ps (\%H_2O)$
	4	6.5	663	$Qs_{sid} = Qs \times 17.647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2 O}{100}\right)$
	3	6,0	683	$-Qs_{sid} = \times 17647 \times - \times \left(1 - \frac{100}{100}\right)$
	ا	5.9	68/	(100)
				215 115
	到	JAP = 2.79	9 Ts=66	$Q_{S_{sid}} = 365 \qquad dscfm M_2 = 29.44$ $M_3 = 28.75$ 140.87
	<i>u</i>	2.61	1.0	$\frac{11}{3}$ $n_3 = 28.75$ 140.87
	7	*	G V	Vi 21230.6 95.77
•	A 75537 A 11777	DAMAN A in Test	in al Enemel Fil	eld Data Sheets\Gas Velocity and Volumetric Flow Rate doc

\\\HAWK\ADMIN\Air Testing\Forms\Field Data Sheets\Gas Velocity and Volumetric Flow Rate doc

dsdm= 332



GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant:	Scott	AFB	Date: 9/10/03 Sucretor Exhast Clock Time: 30.68 Static Pressure, in.H ₂ O: +5.5 Fular wt., Dry: Pitot Tube, Cp: 0.29 Jory Bulb, °F
Sampling I	Location:	-86 1	reservator Exhast Clock Time:
Run #:	Condite	in 5, 8	Operators: RT 76/DA
Barometric	Pressure, in	Hg:	30.68 Static Pressure, in H ₂ O: \pm 5.5
Moisture,	%:	Molec	ular wt., Dry:Pitot Tube, Cp:Pitot
Stack Dime	ension, in. Di	ameter or S	ide 1: Side 2:
Wet Bulb,	°F:	_	_ Dry Bulb, °F
Pitot #		Therm	ocouple #
			•
Traverse	Velocity		$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
Number	in.H ₂ O	Temp,°	
	,	F	$\begin{pmatrix} \alpha \mu_{10} \end{pmatrix} \begin{pmatrix} \alpha \mu_{10} \end{pmatrix} \begin{pmatrix} \Delta$
. 1	7.4	690	$Ms = Md \times \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ $Ms = \left(1 - \frac{\% H_2 0}{100}\right) + 18\left(\frac{\% H_2 0}{100}\right)$ $V_5 = (43, 2^{\frac{4}{7}})^{\frac{4}{7}}$
~	7.6	694	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
3	7.3	674	$Ms = () \times (1 - \frac{100}{100}) + 18(\frac{100}{100})$ $\sqrt{5} = (43, 2)$
4	7-2	693	$Ms = (1 - \frac{100}{100}) + 18(\frac{100}{100})$ $Ms = 23.99$ $Ts = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$ $\Delta \rho = 2.24$
5	6.8	671	$Ms = 23.99$ $Ts = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$ $\Delta P = 2.24$
6	7.0	692	
1	7.6	692	$Ps = Pb + \frac{S.P.}{13.6} = ($ $) + \frac{13.6}{13.6}$
2	7-6	670	$P_{S} = 3 \left(\frac{3.6}{600} \right) \cdot H_{R}$
3	7.5	671	
Ч	7.2	688	$\sqrt{\Delta P} =$
5	6, 1	687	$Vs = 85.49 \times Cp \times \sqrt{\Delta P} \times \sqrt{\frac{Ts(^{\circ}R)}{Ps \times Ms}}$
Œ	5,4	605	$Vs = 85.49 \times Cp \times \sqrt{\Delta P} \times \sqrt{Ps \times Ms}$
			$Vs = 8549 \times () \times () \times $
			vs = 254.7 fils
			Vs = V i fils
			$As = ft^2$
			$Qs = Vs \times As \times 60$
	($Qs = \times \times \times 60$
			$Qs = 750 \cdot 2$ acfm
			Ps (%H ₂ O)
		·	$Qs_{std} = Qs \times 17647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2 O}{100}\right)$
			$Qs_{sid} = \times 17.647 \times \frac{1 - \frac{100}{100}}{100}$
			
	-		00 = 213.4 dectm
1	VAP = 2,64	Ts=b9	$Qs_{sid} = 343.4 dscfm$

1140-

Plant: Scott A: Locce Bose Sample Type: Meth. 18 Operator: Mr. Sampling Location: Generator - 100% Load Phar: 30.68 Ps: Meth. 13.6 As: __ Stack Diameter: Run Number: 100-1 Date: 9-10-03
Pretest Leak Rate: 100 of cfm @ 13 in.Hg.
Pretest Leak Check: Pitot: 100 Orsat: 100

CO₂: 5.7 O₂: 13.6 Probe Length/Type: 3 ft Pitot#:

Nozzle ID: 0.183 Thermocouple #:
Assumed Bws: Filter #: 83045

Post-Test Leak Rate: _____ORotin @ ____ in.Hg.
Post-Test Leak Check: Pitot: _____ Orsat: ____

		THE STATE OF	9										·	,	_	 	 	 		 		
Pump	vacuum (in. Hg)	9	_	-	_		_	-	,	,		1	_									1
r Temp. Im	Outlet		19	62	62	63	79	65	99	99	67	89	69	70							\	14.5 / AD
Dry Gas Meter Temp. Tm	Inlet		23	63	65	69	17	73	hL_	24	77	79	80	18								Tm = 74.5
Impinger	Temp. °F		89	64	23	2.5	25	2.6	57	85	03	26	59	28								
Fe or	Filter		248	15C	250	245	250	756	150	250	8hC	348	8hC	250								Δ
Temperature °F	Probe		250	250	250	756	250	sco.	250	250	751	-	bh C								\	128 /
Stack	Temp (Ts)		750	250	750	750	750	256	750	750	750	199	199	199								9/1
7.	Actual		1.5	1.5	اري/	١.۶	1.5	1.5	9.1	1.6	1.6	1.7	1.7	1.7								1.575 Ts=
Нα	Desired		1.5	1.5	7.5	1.5	1.5	٦.	1.6	9.1	1.6	1.7	1.7	1.7							7,	$\int = \frac{1}{ \nabla ^2}$
Velocity	Head		34°C	24.6	2.46	2.46	2.46	2.46	2.46	2.46	2.46	747	2.47	7.47							1.5697	70
Gas Meter	Reading	821.404	824.9	828.3	831.7	835.2	9-888	1.248	9-548	849.2	852.7	4.958	860.0	187.838								= dV/ S8C1
Clock		85:20	68:03	80:80	52:13	8/:80	68:33	&C:80	68:33	08:38	64:80	8h:80	68:80	85:80								ΔVm = 42
Sampling	Time	0	Ŋ	0/		20		30		0h	٦٥٨	50	5.5	09								∢
Traverse	Number.	0	_																			



Environmental Quality Management, Inc.

SAMPLE RECOVERY DATA

Plant Seample I of	off A	Sample Box No. 1	Run No. 100-5-1 Job No. 0.30174-0006-002 Filter No. 830453						
Train Prepa	ror A		9	1 mor 110.					
-		1A							
,	•								
Front Half Acetone		Liquid Level Marked	Sealed			inggaping distribution and a second s			
Filter									
Container No Sealed									
Description	of Filter <u>4</u> /4								
Back Half/ Container I									
Liquid Lev	el Marked		Sealed						
		Initial Vol		Weight (grams)					
Imp. No.	Contents	(ml)	Initial	Final	Net				
1	DI Hro	100	724.9	788.9	64.0	N N			
- 2	. 11	100.	721.4	693.9	-27.5	1/			
3		_	622-7	627.0	4.3				
4	56-	250	817.0	830-9	13.9	Y			
5									
6 .									
7	l'otal				54.7	•			
Description	of Impinger (Catch: Clev	4			,			

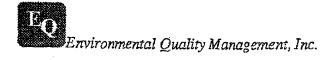
13/16

CO₂: O₂: Probe Length/Type: 3 F+ Pitot#: Stack Diameter: As: Plant: Scatt Air Force Bose Sample Type: Wether Soperator: Loss, Constituting Location: General Force Bose Constituting Pretest Leak Rate: Loss of March 13 in. Hg. Probe Length/Type: 3 Ft Pitot#: Stack Diameter: As:

Nozzle ID: 0.183 Thermocouple #: Assumed Bws: Filter #: PCO17

Assumed Bws: Filter #: fco/7
Meter Box #: 7 Y: (Look AH@: /.63
Post-Test Leak Rate: oo2cfm @ JS m.Hg.
Post-Test Leak Check: Pitot: Orsat:

Pump	Vacuum (in. Fig)		7	50	24	70																				1	8	7
Dry Gas Meter Temp. Tm	Outlet		スな	73	73	73																						
Dry Gas Met	Inlet		73	78	77	26																					Tm = 74	
	Temp. °F		2.9	27	25	م																						
Temperature °F	Filter																											
-	Probe																	-	_	_	\downarrow				_		9	100
Stack	Temp (Ts)		199	199	199	199																					Ts= 666.	
ΑH	Actual		1.7	1.7	0.10	ر ر ر																					0.88	きて
٥	Desired		1.7	1.7	0.10	0.02																					1672 AH = 0.88	D6.30.
Velocity	Head		7.47	2.47	2.47																						,	1.5.1
Gas Meter	Reading	895-698	9.298	8.69.8	870.719																						= dy/ 15U	-
Clock		04:10	08:15	08:20	30:40										•							1					191.9 = MVA	
Sampling	Time	0	8	0/	15	20	250	30	35	Oh	Sh	Ŝ	5.5	0%													♥	
Traverse	Number	Ö	/																									
the State of					77	* * * * * * * * * * * * * * * * * * *	163	15 85		•		•	<u>, </u>			•	1		-1				1	 		L]		



Plant	Scat A	FB		Run No. 10	7-5-2					
Plant Catt AfB Date 9/10/07 Sample Box No. 45B-4 Job No. 030 174 000 (100-5) Z Job No. 030 174 000 (100-5) Z										
Sample Location - De Generatof - 1076 Load Filter No. 16-01/										
Train Prep	parerarer	1014								
Sample Ra	covery Person	74		-						
Comments	S	PS da	vin							
Front Half	•									
Acetone		Liquid								
Container	No	Level Marked	Sealed _							
Filter										
	No.		Sealed							
	n of Filter 46	d								
Back Half/ Container l	Moisture No					band-official-c-				
Liquid Lev	el Marked		Sealed							
Imp. No.	Contents	Initial Vol		Weight (gran	ms)					
	Net									
1	DZ HO	100	709.1	710.7	1.6					
. 2	DA HLO	100	723,6	722-2	-1.4	V				
. 3	~	7-	622.3	619.1	-3-2	1				
4	Silia bel									
5										
6										
ī	'otal				3-3	7				
		-1	·		<u> </u>					

Description of Impinger Catch: Clarky

9/16

N'\Forms\Forms\Emission Testing\Sample Recovery Data.dcc

Plant: Sett Ar Force Bose Sample Type: Methyl Sperator: MY Sampling Location: Generator - 165/26.1 Phar: 30.68 Ps. +5.0 CO₂: 5.8 O₂: 13.4Probe Length/Type: 3.64. Pitot#: Stack Diameter: Run Number: 100-3 Date: 9-10-03

Nozzle ID: $O \cdot I \cdot \mathbf{F3}$ Thermocouple #:

Assumed Bws:

Hilter #: $\mathbf{F3} \cdot \mathbf{50} \cdot \mathbf{50}$ Meter Box #: $\mathbf{7}$ Y: $\mathbf{I} \cdot \mathbf{oot} \cdot \mathbf{AH} \otimes \mathbf{I} \cdot \mathbf{I} \cdot \mathbf{6}$ Post-Test Leak Rate: $\mathbf{oot} \cdot \mathbf{cfm} \otimes \mathbf{I} \cdot \mathbf{n.Hg}$.

Post-Test Leak Check: Pitot: $\mathbf{oot} \cdot \mathbf{cfm} \otimes \mathbf{I} \cdot \mathbf{n.Hg}$.

																•									
		A					г		r · · · ·		, -			, -	 	 	 -	1	r	1		-1	 1	A A	
Pump	Vacuum (in. Hg)		-	,	_	1	1	-	l	1)	_	-	_										7	, フ
Dry Gas Meter Temp. Tm	Outlet		166	22	26	22	77	86	79	80	18	82	S 4 4 4 5 5 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5	18										7/	<i>>℃</i>
Dry Gas Me	Inlet		hL	66	48	28	88	68	90	9.1	16	26	83	63										Tm = 8	\ \
	Impinger Temp. 'F		h9	28	20	28	8-8	29	28	58	59	29	0,9	09											
ture °F	Filter		238	252	253	250	She	150	1251	253	250	152	250	250											>
Temperature ° F	Probe		Eht	250	250	150	156	6hC	bhe	152	152	05 C	250	6hC										2	7
Stack	Temp (Ts)		199	199	199	199	199	683	683	683	683	889	(83	819										Ts = 65	
ρΗ	Actual		2.1	(.)	1.7	(1.7	<i>2-</i> 1	5-1	1.5	1.5	۷.۶	5.1	1.5	1.5										1.581	
٥	Desired		1.7	1.7	1.7	1.7	7.1	1.5	1.5	7.8	1,5	1.5	1.5	1.5									/*	2 H =	>
Velocity	Head		77.C	2.47	Ch.C	2.47	th'C	2.16	2.16	2.16	21.6	91.€	21.6	91.6										JAp = 1.51	9.2
Goc Mater	Reading	870.719	874.3	877.8	9-188	885.3	689.2	24568	895.93	877.5	903.0	4.906	909.9	913.336											
Clock	Time	Sh:49	03:60	ļ.—	10:00	10:05		t. —	10:30	10:35	10:30	10:35	0h :01	10:48										1719.617V	
Committee	Time	0	72		١.	20	,				Sh													▼	
Traverse	Point Number	0																							
ــــا							<u> </u>	1		•					 ш,	 	 			•			 	_	



SAMPLE RECOVERY DATA

Date 9/10 Sample Lo Train Prep	cation <u>General</u> arer <u>DA</u>	Sample Box No.	Load	Job No Filter No.	100-57 030174.00 830502	
		<u> </u>				
Front Half Acetone Container		Liquid Level Marked	Sealed			
Filter Container	No		Sealed _			
Description	of Filter					
Samples St	ored and Locke	ed				
Back Half/ Container l						
Liquid Lev	el Marked		Sealed			
T 37.	0	Initial Vol		Weight (grams)	
Imp. No.	Contents	(ml)	Initial	Final	Net	
1	DIHO	100	733.8	807.6	73.8	
. 2	(1	100.	717.2	683.7		-
3			1,10.0	611:0		_//
4	5G	250	85513	864.3	9.0	V
5						
6						
7	otal			<u> </u>	55,3	<u> </u>

Home

Description of Impinger Catch:

Plant: Scott And Free Base Sample Type: Methol Soperator: wax Sampling Location: Generater—Robot Cond Phar: 30.68 Ps. +5.0
Run Number: 100-4 Date: 9-10-03 CO2: 5.7 O2: 13.5
Pretest Leak Rate: 2004 cfm @ 13 in.Hg. Probe Length/Type: 3 Ft. Pitot#: Stack Diameter: 44 As:

Nozzle ID: 6.183 Thermocouple #:
Assumed Bws:

Filter #: 63053Meter Box #: 7 Y: 1000 AH@: 1.63Post-Test Leak Rate: 30 of fm @ 1 in.Hg.

Post-Test Leak Check: Pitot: Orsat: 100

																							E
Pump	(in. Hg)		,	1	_		_	_	-	~	-	,	_	_								3	>
er Temp. Tm	Outlet		ملاكا	85	20	98	98	98	2	2 %	& &	ما مح	88	80							,	1	89.91
Dry Gas Meter Temp. Tm	Inlet		98	68	16	28	93	hb	95	56	96	96	26	96								Tm = 92	`
Tmninger	Temp. °F		29	67	23	65	27	ملا	88	2.3	09	60	9	09									
ure ° F	Filter		152	254	152	250	bhC	150	248	150	280	250	250	249									
Temperature °F	Probe		3hC	250	OSC	050	150	250	OSC	056	646	056	150	ع)ده								1889	
Stack	Temp (Ts)		883	889	883	683	€89	683	683	683	683	883	889	683								$\overline{T_S} = 68$	
,-	Actual		1.5	١.5	1.5	2.1	7.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5								1.50	
Hα	Desired		7.5	ا.ير	1.5	1.5	1.5	1.5	1.5	7.5	1.5	1.5	1.5	1.5						\ \	2	$\sqrt{\Delta H} =$	
Velocity	Head		2.16	2.16	2.16	2.16	31.6	2.16	91.℃	2.16	2.16	2.16	21.6	2.16							14/49	= 1,47	2.16
Gas Meter	Reading	813.648	917.0	9.068	0.469	927.6	931.1	934.6	938.1	941.7	945.2	2.846	952.3	955.844							`	1.196 1/1/0 =	
Clock	e E	85:01	11:03	-	11:13	8/://	11:23	80:11	11:33	85:11	11:43	11:48	11:53	, 85:11								4391.CH = MVA	İ
Sampling	Time	0	8		15		25		35	40	Sh		25	09								٥	
Traverse	Point		_																				



SAMPLE RECOVERY DATA

Plant Sc	off AFT	Sample Box No. Fr Enhant - Lo		Run No	100-5-4	
Date 9/10	103	Sample Box No.	H56-1	Joh No.	30174-10	06.003
Sample L	ocation General	- Luhast -Lo	adm 100%	Filter No.	830 532	<u> </u>
Train Pres	parer DA					
Sample R	ecovery Person	DA				
Front Half			•			
Acetone	37	Liquid				
Container	No	Level Marked _	Sealed _			
Filter						
Container	No		Sealed			
Descriptio	n of Filter BL	ich				
Samples S	tored and Lock	ed				
Back Half						
Liquid Lev	el Marked		Sealed			
Imp. No.	Contents	Initial Vol		Weight (gr	ams)	
		(ml)	Initial	Final	Net	
1	DAHO	100	736.7	8058	69.1	V
- 2	11	100	706.1	6826	-23.5	
3			622.5	622-9	0.4	
4	36-	250	8309	839.9	9,0	
5						
6 .						
3	Total				5500	
		- /	4			

Description of Impinger Catch: Claudy

14010



EPA METHOD 30 VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Company: _	Scott AFB		City: O Fallon Alivor's Location: _ 86 General
Date: 9	18/03		Location: - 86 Generator
Time:	7		Run #: 0030-1
Meter #:	NB-1		Y-Factor:
Barometric F	Pressure, in.Hg: 30.6	, 5	Operator: <u>Ribilio</u>
	nperature, °F:		Purge Time:
Pre-test: Post-test:	Initial, in.Hg	Vacuum Leak Chec Final, in.Hg 25. o	k Data Time, min.

		Clock	Meter		Dry Gas		
9/0/03	Sample	Time,	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
70/0	Time (min)	(24-hr)	(liter)	Setting	(°F)	(in.Hg)	Temp, °F
9/8/03 Condition 1	0	1531	9822, 95	6 25	85/85	1	250
	5	1536	9823.5	0-25	84/35		250
	İv	1541	982420	0.25	85185		250
11.2	Suitial Um	6423	9824.49				
Up/1/03 Condition 2	ja:5	0829	4324.6	0.25	70 /66	į	250
n 1: 1 2	15,0	0827	9629.1	0.23	71/70	ï	250
Condition	17.5	0830	98255	0. 25	72/72	(250
	2 0.0	1633	7826.20	0.25	72/72	1	250
		1215					
. 4 . 7	25,	1220	9827.5	0.25	96/96		250
and ten?	30	1225	9829.0	0.25	97/97	l l	250
a/9/03/	35	1543	98300	0.25	86/87		250
1177	(a)	1548	9831.0	0.25	186/87		250

 $V_{std} = V_{m} (liters) \times Y \times 17.647 \times \frac{P_{b}(in.Hg)}{T_{m}(^{\circ}R)}$ $V_{std} = V_{m} (liters) \times Y \times 17.647 \times \frac{P_{b}(in.Hg)}{T_{m}(^{\circ}R)}$



Juge 2

EPA METHOD 30 VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Meter #: Barometric F	Scott of 1/10/03 VB-1 Pressure, in.Hg. operature, °F:	30,60		Run #: Y-Facto Operato	Ofallor n:	
	Initial in II		ım Leak Ched			
Pre-test:	Initial, in.H	g rilla	ii, iii.rig	Time, min.		
Post-test:						
	Clock	Meter		Dry Gas		
Sample	Time og 2	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
Time (min)	(24-hr)	(liter)	Setting	(°F)	(in.Hg)	Temp, °F
40	of 983/10	9831.0	0.23	68/68	ŧ	240
49	0817	9832.0	0.25	68/68	L	250
50	0822	9833,42	0.750	69/69		250
						•
			·			
Nitrogen pur	ge/activated car	rbon packing i	n sample hok	ding container: _		

$$V_{std} = V_{m} (liters) \times Y \times 17.647 \times \frac{P_{b} (in.Hg)}{T_{m} (\circ R)}$$

 V_{std}



VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Company: Scott AFB	City: O'Fallow Illinois
Date: 9/4/03	Location: - 86 General
Time:	Run#: <u>\$515~</u> /
Meter #:	Y-Factor:
Barometric Pressure, in.Hg: 30.65	Operator: Dible
Ambient Temperature, °F:	Purge Time:

Vacuum Leak Check Data Time, min. Initial, in.Hg Final, in.Hg Pre-test: Post-test:

		Clock	Meter		Dry Gas		
1/2	Sample	Time,	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
9/3/07	Time (min)	(24-hr)	(liter)	Setting	(°F)	(in.Hg)	Temp, °F
9/3/03	Q	1531	5521.94	0-25	85/85		NA
,	5	1536	5522.Ce	0,25	87/84	1	NA
	12	1541	5523.50	0.25	87/85)	NA
11.	Dritted Von	0623	5527,54	O-			
9/9/03 Condition 2	125		5523	0.25	68/66	1	NIA
C 11/2 2	15.2	0827	5524.3	0.25	69/67	Ĺ	NIA
(milital)	17.5	0832	5525.3	6.23	71/67	l	NA
	26.5	0833	5526.75	6.25	761/68	11	NA
9/9/03		1215			/		
Combian 3	25	1220	5527.3	0.25	95/93		NA
Company	30	1225	5528.le	0.25	97/94	ì	N/A
	35	1543	5529.9	0.25	88/86	(NA
μ ή	49	1548	5531.12	0.25	189186		rÚ/A

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_m \text{ (liters)} \times Y \times 17.647 \times \frac{P_b \text{ (in. Hg)}}{T_m ({}^{\circ}\text{R})}$$

 V_{std}



Environmental Quality Management, Inc

EPA METHOD 30

VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Company: Date: 9/ Time: Meter #: Barometric Pr Ambient Tem	ressure, in.Hg	: 30.68		Run #: Y-Facto Operato	0 fallou n: - 86 5515-1 or: r: pk ime:	
		Vacuu	ım Leak Chec	k Data		
	Initial, in.H	lg Fina	al, in.Hg	Time, min.	_	
Pre-test: Post-test:					-	
	Clock	Meter		Dry Gas	•	
Sample	Time,	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
Time (min)	(24-hr)	(liter)	Setting	(°F) 67/67	(in.Hg)	Temp, °F
40	0812	553/12	0,25	67/67	l	NIOT
45	0817	5532,4	0.25	69/66	ŧ	NA
50	0822	5533.76	0-25	69/69	/	NA
				,		
						<u> </u>
				<u> </u>		<u> </u>
			<u> </u>			
		<u> </u>				
			in sample hol	ding container:		
$V_{std} = V_m$ (lite	rs)× Y×17.64	$47 \times \frac{P_b(\text{in.Hg})}{T_b(0.D)}$				

 $T_{m}(^{\circ}R)$

 $\boldsymbol{V}_{\text{std}}$

FIELD DATA SHEET

Pretest Leak Check: Pitot: 🗸 Orsat: 🦳 Pretest Leak Rate o. o. cfm @ 1/5 in. Hg.

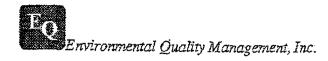
Sampling Location: Run Number:09/1-

Pbar: 30,65 Ps: 7.3/
CO₂: O₂: O₃: Probe Length/Type: 2,642,Pitot#: Stack Diameter: 4 As: Operator: 2

Post-Test Leak Rate: Nozzle ID: 0.(97 Assumed Bws: 3
Meter Box #: 8

(1902) △H@: (1547) cfm@___in.Hg. itot: ____Orsat: ___ Post-Test Leak Check: Pitot:

9/0/2	Traverse	Sampling	Clock	Gas Meter	Velocity	Ηδ	7	Stack	Temperature °F	ture ° F		Dry Gas Met	Dry Gas Meter Temp. Tm	Pump
in do h	Number	Time		Rending	Head	Desired	Actual	Temp (Ts)	Probe	Filter	Temp. F	Inlet	Outlet	(in: Hg)
6		0	1520	517.765										
9 /		2.5	1523		1.6/	1.99	1.99	<i>رب</i> \$	250	250	62	SS N	85	_
غ چ م			1525		1,61	657	199	300	253	238	59	23	85	
نج		2.5	1527	523.9	19%	667	667	300		249	26	83	85	-
		00/	1530	525.764	<i>a</i>]'/,	657	667	300	542	£ 52	57	128	8.5	Ĵ
13 Like 2	Jush chade		•	525,979	H.									
40/6/		10.0	10.0 0810	525.419	2.01	/، 84	h97	£.54	. 1	152) 7)	ره ع	79	
-		12.5	6130	527.8	10.6	587	1.84	52₹	+4°C	245	25	7 %	79	,
				529.7	2.01	184	189	524		252	8%	63	79	- :
				531.6	2.0(1.84	187	524	152	253	76	59	63	1
		20,0	0880	533608		1.84	1,84	となみ	282	152	47	99	63	,
)	•	1303			•								
つかれる		28.6	1206	235,7	7.6	61	67	755	152.	2536	00	ag	92	
w.		25.6	1208	537.4	٦٠ (1.9	1.9	552	256	-)52	85	90	82	į
adolis?		27,5	1211		2.1	63	1.9	552	152		57	16,	25	
			6121	441.405	1,4	611	1.9	552	152	250	5.5	16	26	_
T	1		0551											
Condition		37.5	755]	6423	57.72	1.1	(.7	02%	256	151	67.	28	58	
<u></u>		032	1,455	644.9	J. K	1.7	4.7	or "	256	250	56	85	28	,
		375	1551	64713	2.25	1.7	1.7	lero	_	25/	49	36	58	
!	L	40.0	1600	548,865	2.25	1.7	1.7	(020)	250	150	6,7	84	84	
15, All 1		¥	0.800	549,115)						
المامدين		19.5	6080	0.155	3,35	<u>م</u> من	<i>&7</i>	750	9%	761	1,3	/ d	23	
6/3/			1805	553.1	کد ، و	80	1.8	7,60	752	157	5	, c	63	
(10) (a)			(DA0)	5,55.0		09	-	750			(h	59	Č,	-
-		0.85 0	0100√ ~ m√	5.56.619	$\sqrt{\Delta p} = \partial \cdot V$	$\Delta H = $	g	$\overline{Ts} =$	349	150	45	<u> 7 س</u> = ده ه	J \ (e:	_
				•	1.424	7	1.88.1	246	>	٠		F	>	



SAMPLE RECOVERY DATA

1 12 TP 4	2/AL A/ /		- 5	Run No. 1	3 15 11
Sample T	18/03-1/10/03	Sample Box No.	20-3	Job No	020174.006.002
				Filter No.	NA
Sample R	POTETY Person	BA_{3}	DI.	***************************************	
Comment	s menus	CHLORIDE R	2,2550		<u></u>
·	TEVACANCE	- Cocine			· · · · · · · · · · · · · · · · · · ·
Front Hal	f				
		Liquid			
		Level Marked	Sealed_		
Filter			_		
Container	No	,	Sealed _	• •	
)eccintic	n of Citor				
sescriptio.	n or thier		· .		
amples S	tored and Locke	-d1			
2					
ack Half/	Moieture				
				,	
	No				
Container l	No				
Container l	No		Sealed		
Container l	No		Sealed		
ontainer liquid Lev	No	Initial Vol		Weight (gr	rams)
ontainer liquid Lev	No rel Marked Contents	Initial Vol (ml)	Initial	Weight (gr Final	rams) Net
iquid Lev	No rel Marked Contents DUIH	Initial Vol (ml)	Initial	Weight (gr Final 75/. 3	rams) Net 32.3
iquid Lev mp. No.	Contents DUIH DUIH	Initial Vol (mI)) OO	Initial 719.0	Weight (gr Final	rams) Net 32.3
iquid Lev mp. No.	Contents DUPH DUPH DNPH	Initial Vol (ml)	Initial	Weight (gr Final 75/. 3	rams) Net 32.3
iquid Lev mp. No. 1 2 3 4	Contents DUPH DUPH DNPH	Initial Vol (mI)) OO	Initial 719.0	Weight (gr Final 75/, 3 737. %	rams) Net 32.3
iquid Lev mp. No.	Contents DUIH DUIH	Initial Vol (ml)) 00 100	Initial 719.0 731.4 716.8	Weight (gr Final 75/. 3 737. % 717.0	rams) Net 32.3 0.4 0.2
iquid Lev mp. No. 1 2 3 4	Contents DUPH DUPH DNPH	Initial Vol (ml)) 00 100	Initial 719.0 731.4 716.8	Weight (gr Final 75/. 3 737. % 717.0	rams) Net 32.3 0.4 0.2

12/16

MF2 LIGHTING UNIT GENERATOR



GAS VELOCITY AND VOLUMETRIC FLOW RATE

	Dlant	Scatt 1	EB	Date: 8/12/83
	Compline 1	ocation:	MEZ	Date: 9/10/83 Clock Time:
	Dam #	Cocadon	10	112 Operators: QK/TG
	Rarometric	Pressure in	1 / Km.	7.68 Static Pressure, in.H ₂ O:
	Moisture	%.	Moleo	ouler put Drug Ditet Tube Co. 2 99
٤	Stack Dim	encion in Die	Molec	cular wt., Dry: Pitot Tube, Cp: 0.19 Side 1: 3" Side 2:
	Wat Dall	°E.	amerer of 9	D. D. B. C.
	Ditat #	Г.	7°L	_ Dry Bulb, °F:
	F IIOI #	· · · · · · · · · · · · · · · · · · ·	THELII	ocouple # Vs1-14.08 AcF-=
Ī	T	\$7.1		$ Md = (0.44 \times \% CO2) + (0.32 \times \% O2) + (0.28 \times \% N2) P_{5,1} = 2.0.69 Md = (0.44 \times) + (0.32 \times) + (0.28 \times) Ms, = 2.0.98 dsect. $
	Traverse	Velocity	α. ι	MS, = 28.98 dscf
	Point	Head	Stack	$Ma = (0.44 \times) + (0.32 \times) + (0.28 \times)$
	Number	in.H ₂ O	Temp,°	$Md = 29.336$ $A_{s} = 0.0873$
o how		0 - 11	F	$\{H_1, H_2, \dots, \{H_2, H_2, H_2, H_2, H_2, \dots, H_2, H_2, \dots, H_2, H_2, \dots,$
ا ا		0.04	211	$\sqrt{s} = 7.97$
Continul Dan !	<u>~</u>	0.04	241	Z9.854 (3.5) (s.c)
20-	3	0.04	257	$\int_{-\infty}^{\infty} ds = (1 - \frac{1}{100}) + \frac{18}{100}$
127	۴	0.035	267	Ms = 28.94
, 0°°	5	0.03		$Ms = 28.94$ $Ts = 284 ^{\circ}F = 749 ^{\circ}R(^{\circ}F + 460)$ $\Delta f = 0.0108$
15 +0° 142 0 = 0.0845 D0 = 263	نا	0.03	270	, ,
17,0 245	- (0103	258	$Ps = Pb + \frac{S.P.}{13.6} = (80.68) + \frac{40.01}{13.6}$ $DN = 0.495$
Uan Va.	2	0.035	265	13.6 13.6 K= 77.59 Ps = 30.68 in Hg
50% 13	3	6.035	272	1
10 100	4	6.03	277	√ <u>AP</u> = 0.185
15	ς	0.03	280	$V_{S} = 8549 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}(^{\circ}R)}{P_{S} \times M_{S}}}$
	L	0.035	281	$V_{S} = 8549 \times Cp \times \sqrt{\Delta P} \times \sqrt{P_{S} \times M_{S}}$
o treat	1	0.04	267	Vs = 85.49 × (0.99)× (0.185)× √ 749 30.68 x Zg.94
onditto	2	0.04	762	30.68x 29.44
Condition 1	,	0.04		Vs = 14,38 ft/s
0-		0.035	281	As=OPA fi2 TrrZ
·	5	0.03		j
	ا	0.03	302	$Qs = Vs \times As \times 60$
10.01	1	0.035	268	$Qs = \times \times 60$
FO	2	0.035	291	Qs = 42.33 acfm
	•	0.03	305	Pe (Solland)
	¥	0,03	308	$Qs_{std} = Qs \times 17.647 \times \frac{Ps}{Ts} \times \left(1 - \frac{\% H_2 O}{100}\right)$ $Qs_{std} = 42.33 \times 17.647 \times \frac{30.6\%}{149} \times \left(1 - \frac{3.5}{100}\right)$
	6	0.03	309	05 = 47.32 ×17.647 × 30.68× (1-3.5)
	لغا	0.035	309	ત્રાવ (100)
		TAR Int	Tone	$Qs_{std} = 79.53 dscfm$



GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant:	Soft	AFP	Date: 9/10/03 Clock Time: 1601-1686
Sampling 1	Location:	M72	Extrasr Clock Time: 1607 - 1606
Run #:	Conda 16	1 Pu	Date: 4/10/03 Exhres Clock Time: 1601-1606 Operators: 4K/76 Static Pressure, in.H ₂ O:
Barometrio	Pressure, in.	Hg: (3)	Static Pressure, in.H ₂ O:
Moisture,	%:	Molec	ular wt., Dry:Pitot Tube, Cp:Pi
Stack Dim	ension, in. Di	ameter or S	ular wt., Dry: Pitot Tube, Cp: 9, 99 ide 1: 3" Side 2: Dry Bulb. °F:
Wet Bulb,	°F:		_ Dry Bulb, °F:
Pitot #		Therm	ocouple #
-			•
Traverse	Velocity		$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$
Point	Head	Stack	$Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$
Number	in.H ₂ O	Temp,°	$Md = (0.44 \times \% CO_2) + (0.32 \times \% O_2) + (0.28 \times \% N_2)$ $Md = (0.44 \times) + (0.32 \times) + (0.28 \times)$ $Md = 5$
	,	F	(a u o) (a u o) †
1	6,004	27/	$Md = \{0.44 \times \} + \{0.32 \times \} + \{0.28 \times \}$ $Md = \begin{cases} Md = \begin{cases} 5/4 + 6 \\ 100 \end{cases} + 18 \left(\frac{5/4}{100}\right) + 18 \left(\frac{5/4}{100}\right) \end{cases}$ $Ms = (1 - \frac{5/4}{100}) + 18 \left(\frac{5/4}{100}\right) + 18 \left(\frac{5/4}{100}\right) \end{cases}$
7.	0.0035	279	
<u>,</u>	0.0035	282	$Ms = () \times (1 - \frac{100}{100}) + 18(\frac{100}{100})$
	0,0035	002	(101)
	01035	302	Ms =
7	0.035	307	$\overline{Ts} = {}^{\circ}F = {}^{\circ}R({}^{\circ}F + 460)$
<u> </u>		299	$Ps = Pb + \frac{S.P.}{13.6} = () + \frac{13.6}{13.6}$
2	6.630	204	$PS = Pb + \frac{13.6}{13.6} = \frac{1}{13.6}$
3		301	Ps= in Hg .
	6.035	290	$\sqrt{\overline{\Delta P}} =$
<u> </u>	0.00		1 '
<u> </u>	0,04	750	$V_{S} = 8549 \times C_{P} \times \sqrt{\Delta P} \times \sqrt{\frac{T_{S}(^{\circ}R)}{P_{S} \times M_{S}}}$
1	0,0	2 00	· · · · · · · · · · · · · · · · · · ·
		-	$Vs = 8549 \times ($ $)\times ($ $)\times $
		<u> </u>	Vs = ft / s
<u>'</u>			,,,,
		 	$As = ft^2$
,		-	$Qs = Vs \times As \times 60$
		 	25-73 7 73 700
	-	 	$Qs = \times \times 60$
		<u> </u>	Qs = acfm
	ļ	<u> </u>	$O_{S,1} = O_{S} \times 17.647 \times \frac{P_{S}}{100} \times \left(1 - \frac{\% H_{2}O}{100}\right)$
	·	 	$\begin{cases} Q s_{std} = Q s \times 17647 \times \frac{P s}{T s} \times \left(1 - \frac{\% H_2 O}{100}\right) \\ Q s_{std} = \times 17.647 \times \dots \times \left(1 - \frac{100}{100}\right) \end{cases}$
			$-Qs_{std} = \times 17.647 \times \times \left(1 - \frac{100}{100}\right)$
	 	<u> </u>	
<u> </u>	JOP =	<u>Ts</u> =	$Qs_{std} = dscfm$

FIELD DATA SHEET

CO₂: $\frac{4 \cdot 4}{\text{Probe Length/Type}}$ $\frac{3 \times 4 \cdot 15 \cdot 2}{\text{Stack Diameter:}}$ As: Plant: Scott Air Force Base Sample Type: Meshal & Operator: MY Run Number: L-L Date: 9-10-03
Pretest Leak Rate: .005 ofm @ 14 in.Hg.
Pretest Leak Check: Pitot: __Orsat: ___ Sampling Location: Libts

Nozzle ID: $\frac{0.49S}{\text{Meter Box #:}}$ Filter #: $\frac{830533}{\text{AH}@: L63}$ Post-Test Leak Rate: $\frac{.005}{\text{Cfm}}$ © A.H. Orsat:

																				R	10
Pump	(in. Hg)		_	_	_		_	-	_	-	U	u	LA	1							
r Temp. Tm	Outlet		88	8	80	00	88	80	684	00	68	90	2	16						\	1
Dry Gas Meter Temp. Tm	Inlet		88	& &		06	16	92	93	26	24	36	95	96							Tm = 93.
Imninger	Temp. °F		29	62	63	60/	57	26	26	55	25	55	55	55							
Temperature ° F	Filter		450	250	250	250	250	250	6h2	300	300	1251	250	OSC							
lember	Probe		249	250	6hC	250	OSC	250	250	250	250	351	150	250							636
Stack	Temp (Ts)		263	263	263	E9C	89C	263	292	263	263	263	263	263						\	75= 2
-	Actual		49.0	6.64	6-64	64	h9"0	49.0	0.64	49.0	0.64	69.0	79.0	0.64							× 49.0 =
Рγ	Desired		0.64	19.0	0.64	19.0	19.0	19.0	6.64	49.0	0.64	49.0	0.64	79.0						,	\sqrt{H}
Velocity	Head		0,0108	0.0108	0.0108	0.0108	0.0108	0.0108		0.0108		0.0108	0.0108	0.010%							VAP = 0.1039V
Gas Meter	Keading	956.136	.د	0.	3.3	965.7	1.896	970.5	973.2	975.1	7	$\neg \gamma$	982.6	985.008							£73.
Time		13:13	13:18		13: 28	13:33		13:43	8h:81	13:23			14; 08,	14:13							5Vm=28
Sampling	Time	0	>	01	15	20	SC	δć	35	40	45	50	58	9							< □
Point	Number	Q																			



SAMPLE RECOVERY DATA

Plant So	coff AFB			Run No. LC		
Date 9/1	0/03	Sample Box No	HSB-4	Job No.		
Sample Lo	cation LBAL	Generatur		Filter No.	170533	
Train Prep	arer DA	·····				
		DA-				
Front Half						
Acetone		Liquid				
Container:	No	Level Marked	Sealed			
Filter						
Container :	No		Sealed _			
	8	old Black				
Description	of Filter	0/10/ 12/000				
osmbies 2	OLEG RUG LOCK	ed				
Back Half/	Moietime					
COMMINA	.10.					·
Liquid Lev	el Marked		Sealed			
					<u> </u>	
7 . 31		Initial Vol	T T	Weight (gra	ms)	
Imp. No.	Contents	(ml)	Initial	Final	Net	
1	DEH-0	COO	708.6	752-5	4/3-9	V
. 2	V.	100	725.9	704.9	-21-0	
3		-	620.8	619-6	-1,2	
4	56-	750	903-2	903.1	-0.1	V
5			10/	100.1	<u> </u>	
6 .			 			
	Paul I	<u> </u>	ļ			
	otal	<u> </u>			216	V
		1				

Description of Impinger Catch: Yellow, Cloud,

Malla

FIELD DATA SHEET

Plant: Scott Air Force Base Sample Type: Washed S Operator: Lot I force Base Sample Type: Washed S Operator: Lot I force Base Sample Type: Washed Sampling Location: Lights Phar: 30.68 Ps: +0.01

Run Number: L-2 Date: 7-10-03

Pretest Leak Rate: 201 cfm @ Lyin.Hg. Probe Length/Type: 3 + Pitot#: 0.99

Pretest Leak Check: Pitot: Orsat: Stack Diameter: 3" As:

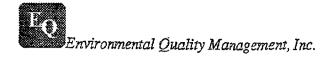
Nozzle ID: 0.495 Thermocouple #:

Assumed Bws: Filter #: 830527Meter Box #: 7 Y: 1.066 AH@: 1.63Post-Test Leak Rate: 0.05 cfm @ 2.1 in.Hg.

Post-Test Leak Check: Pitot: 1.00 Orsat:

Sampling Clock Reading Head Desired Actual Octive Head Desired Actual Octive Head Desired Actual Octive Head Desired Actual Octive Head Desired Actual Octive Head Octive	Temperature ° F Immage Dry Gas Meter Temp: Tm	Temp (Ts) Probe Filter Temp. F Inlet Outlet (in. Hg)	6 67 550 OSC 89C	263 250 252	156 25C 83c	263 251 250 60 95	65 05C 6hC 89C	95 LS OSC OSC E9C	76 CS 050 BHC 890	1 26 79 50 50 55 62 1	79 72 056 ESC 69C	56 79 50 57 97 93	C E6 26 250 87 69C 1	263 250 250 57 98 93						
Clock Gas Meter Reading 14:28 986.150 14:34 988.6 14:39 991.0 14:49 995.8 14:49 995.8 14:59 1000.7 15:09 1003.1 15:29 1003.1 15:29 1013.2 15:29 1013.2 15:29 1013.2 15:29 1013.2		Desired						10.64						P3.0						
	-		 988.6 0.	991.0 0.	983.4	S	6-866	10001	1003.1.00	1005.5	1008.0	1010.3	1013.2	1015-145						
		-			15 14:44						,		,							

0.0(081



SAMPLE RECOVERY DATA

Plant	Scott H	FB		Run No.	630527	
Date 9/	10/03	Sample Box No.	HSB-3	Job No.		
Sample Lo	ocation Light	Generator		Filter No	830527	
Train Prep	parer					
Sample Re	parer	124				
Comment	S		···-			
Front Half	•					
Acetone	_	Liquid				
	No.	Level Marked	Sealed			
Filter						
Container	No		Sealed _			
Description 1	n of Filter	of od Black				
Samples S	tored and Lock	ed		·		
Back Half/						
Container 1	No			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
Y * *- * T	. 137 1 1					
riding rea	el Marked		Sealed			
		Initial Vol		Weight (gra	ems)	
Imp. No.	Contents	(ml)	Initial		Net	
1	DAHO	w	.1	788.	53.6	V
. 2	· ·	100.	715.1	683.7	-31-4	1
. 3	<u> </u>		610.6	609.6	-1.0	
4	36	250	834.2	847.0	12.8	
5						
6 .						
7	rotal	-			34,0	V
		<u></u>	<u> </u>	<u> </u>	1 3/,0	

Description of Impinger Catch: Tolon, Cloudy

20/10

FIELD DATA SHEET

CO₂: 4.4 O₂: 45.01

Probe Length/Type: 3.4. Pitot#: 0.99

Stack Diameter: 3." As. Sample Type: Weth.) S Operator: Property Phar: 30.68 Ps. +6-01 Sampling Location: Cithts
Run Number: 2-3 Date: 9-10-03
Pretest Leak Rate: 2003 cfm @ 12 in.Hg.
Pretest Leak Check: Pitot: Corsat: Plant: Sott Air Force Base

Nozzle ID: 0.495 Thermocouple #:

Assumed Bws: Filter #: $\frac{RCOl3}{1.006}$ Meter Box #: $\frac{1}{1.00}$ Y: $\frac{1.006}{1.006}$ AH@: $\frac{1.63}{1.00}$ Post-Test Leak Rate: $\frac{1.00}{1.00}$ cfm @ $\frac{1.00}{1.00}$ in.Hg.

Head Desired Actual Temp (18) Probe Filter Temp Fig Index Outlet		Time	Gas Meter	Velocity	ام	ΦH	Stack	Temperature °F	ure ° F	Impinger	Dry Gas Me	Dry Gas Meter Temp. Tm	Pump
0.0108 0.64 0.64 263 2948 251 66 93 93 0.0108 0.64 0.64 263 250 253 66 95 93 0.0108 0.64 0.64 263 250 249 62 96 93 0.0108 0.64 0.64 263 250 251 57 93 0.0108 0.64 0.64 263 250 251 57 97 93 0.0108 0.64 0.64 263 250 249 57 99 99 0.0108 0.64 0.64 263 250 249 57 99 0.0108 0.64 0.64 263 263 265 265 265 265 265 265 265 265 265 265		2	Reading	Head	Desired	Actual	Temp (Ts)	Probe	Filter	Temp. °F	Inlet	Outlet	(In. Hg)
0.0108 0.64 0.64 363 348 351 66 95 93 0.0108 0.0108 0.64 0.64 363 250 253 66 95 95 0.0108 0.018 0.64 263 250 249 62 96 93 0.018 0.018 0.64 0.64 263 250 251 250 60 97 93 0.0108 0.64 0.64 263 250 251 57 97 97 93 0.0108 0.64 0.64 263 250 251 57 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 97 0.0108 0.64 0.64 263 250 249 57 97 97 97 97 97 97 97 97 97 97 97 97 97	_	Ch:S	015.480										
6 0.0108 0.64 0.64 263 250 253 66 95 93 6 0.0108 0.64 0.64 263 250 249 62 96 93 1 0.0108 0.64 0.64 263 250 259 60 97 93 1 0.0108 0.64 0.64 263 250 250 59 98 94 1 0.0108 0.64 0.64 263 250 259 59 98 94 20.0108 0.64 0.64 263 250 249 59 99 94 20.0108 0.64 0.64 263 250 249 59 99 94 20.0108 0.64 0.64 263 250 249 59 99 94 20.0108 0.64 0.64 263 250 249 59 99 94 20.0108 0.64 0.64 263 250 249 59 99 94 20.0108 0.64 0.64 263 250 249 59 99 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 249 59 20.1039 0.64 0.64 263 250 250 250 249 59 20.1039 0.64 0.64 263 250 250 250 250 250 250 250 250 250 250	1 -	Ch:51	9.110	0.0108	79.0	h9.0	£9C	8hC	750	9,9	43		-
6 6.0108 0.64 0.64 263 250 249 62 96 93 0.0108 0.64 0.64 263 250 250 61 96 97 93 0.0108 0.64 0.64 263 250 250 60 97 93 0.0108 0.64 0.64 263 250 250 59 99 99 0.0108 0.64 0.64 263 250 249 59 99 99 0.0108 0.64 0.64 263 250 249 59 99 99 0.0108 0.64 0.64 263 250 249 59 99 99 0.0108 0.64 0.64 263 250 249 59 99 99 0.0108 0.64 0.64 263 250 249 59 99 99 0.0108 0.64 0.69 263 250 249 59 99 99 0.0108 0.64 0.69 263 250 249 59 99 0.0108 0.64 0.69 263 250 249 59 99 0.0108 0.64 0.69 263 250 249 59 99 0.0108 0.64 0.69 263 250 249 59 99 0.0108 0.0108 0.69 263 250 249 59 0.0108 0.0	_	5:57	020.3	0.0108	6.64	73.0	263	250	253	99	26	93	_
1 0.0108 0.64 0.64 263 250 250 61 96 93. 1 0.0108 0.64 264 263 251 250 60 97 93. 1 0.0108 0.64 0.64 263 250 250 59 98 94 1 0.0108 0.64 0.64 263 250 250 59 98 94 2 0.0108 0.64 0.64 263 250 249 59 99 94 3 0.0108 0.64 0.64 263 251 250 99 99 3 0.0108 0.64 0.64 263 251 250 99 99 3 0.0108 0.64 0.64 263 251 250 99 99 3 0.0108 0.64 0.64 263 251 263 99 4 0.0108 0.64 263 251 263 99 4 0.0108 0.64 263 263 963 70 Tm = 26.039		15:51		2010-0	69.0	h) 0	E9¢	052	1246	62	96	63	-
0.0108 0.64 0.64 263 250 250 60 97 93. 0.0108 0.64 0.64 263 250 250 59 99 94 0.5108 0.64 0.64 263 250 249 59 99 94 0.0108 0.64 0.64 263 250 249 59 99 94 0.0108 0.64 0.64 263 250 249 59 99 94 0.0108 0.64 0.64 263 251 250 59 99 99 24 0.0108 0.64 0.64 263 251 270 59 99 99 24 0.0108 0.64 0.64 263 251 249 59 99 99		(6:02	1	8010.0	79.0	69.0	263	250	250	19	16	93.	
0.0108 0.64 0.64 263 250 251 57 97 93. 0.0108 0.64 0.64 263 250 250 59 59 98 94 0.0108 0.64 0.64 263 250 249 57 99 94 0.0108 0.64 0.64 263 250 249 59 99 0.0108 0.64 0.64 263 250 249 59 99 0.0108 0.64 0.64 263 257 250 59 99 0.0108 0.64 0.64 263 257 249 59 99 0.0108 0.64 0.64 263 245 249 59 99 0.0108 0.64 0.64 263 245 249 59 99 0.0108 0.64 0.64 263 245 249 59 99	·	F	P.700	80,000	69.0	69.0	28.33		250	60	97	93.	_
0.6108 0.64 263 250 250 59 98 94 0.6108 0.64 0.64 263 250 291 59 98 94 1 0.0108 0.64 0.64 263 250 249 59 99 94 340.0108 0.64 0.64 263 250 249 59 99 340.0108 0.64 263 250 249 59 99 340.0108 0.64 263 245 249 59 99 340.0108 0.64 263 245 249 59 99	·		029.8	0.0108	<i>ħ9. ⊙</i>	P9.0	263		251	20	1	93.	
0.6108 0.6108 0.64 263 250 251 59 99 94 1 0.0008 0.64 0.64 263 250 249 59 99 94 24 0.0108 0.64 0.64 263 259 249 59 99 94 24 0.0108 0.64 263 249 29 99 99 24 0.1039 0.64 263 249 29 99 99			032.2	8010.0	h9.0	h9.0	263		250	6/8		66	,
1 0.0108 0.64 263 250 249 57 99 94 0.0108 0.0108 0.64 263 251 250 549 59 94 94 94 0.0108 0.64 263 252 249 59 94 94 94 99 0.0108 0.64 263 249 59 94 94 94 94 95 94 94 94 95 94 94 94 95 94 94 94 94 95 94 94 94 94 95 94 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 94 95 94 95 94 94 95 94 95 94 94 95 95 95 95 95 95 95 95 95 95 95 95 95			9.480	8010.0	h9.0	h9:0	EIC	250	755	52	86	56	_
039.5 0.008 0.64 0.64 263 251 250 59 99.8 044.324 0.0108 0.64 263 250 249 59 99 99 044.324 0.0108 0.64 263 245 245 263 47 5= 26.5			037.1	2010.0	h9.0	19°0	598	250	249	29	66	66	3
24 6.0108 0.64 0.64 263 250 249 59 99 24 6.0108 6.64 0.64 263 249 29 99 99 24 6.0108 6.64 0.64 263 249 59 99			038.5	0.0108	b9°€	b3.0	263	150	250	59	66	44	B
946.0108 6.64 0.64 263 249 59 99 94 1			. •	0.0108	h9.0	<i>b</i> 3.0	263	osc	6hC	29	00	16	R
$\frac{1}{\sqrt{\Delta p}} = \frac{0.1039}{\Delta H} = \frac{1}{26.5}$		7h:91	044.324	10.0108	h9.0	69.0	E9C	249	249	59	66	46	4
$\frac{1}{\sqrt{\Delta p}} = \frac{0.1039}{\sqrt{\Delta p}} \sqrt{\Delta H} = \frac{1}{2.63} \sqrt{\frac{1}{1.5}} = $						·							
$\frac{1}{\sqrt{\Delta p}} = \frac{0.1039}{\sqrt{\Delta P}} = \frac{1}{2.63} = \frac{1}{2.$													
$\frac{\sqrt{\Delta p} = 0.1039}{\sqrt{\Delta p} = 0.64} \sqrt{T_s = 263} \sqrt{T_m} = \frac{96.5}{2}$													
$\frac{\sqrt{\Delta p} = 0.1039}{\sqrt{\Delta p} = 0.044} \sqrt{T_S = 263} \sqrt{T_m} = \frac{96.5}{2}$													
$\sqrt{\Delta p} = \frac{0.1039}{\sqrt{\Delta P}} \sqrt{\frac{1}{15}} = \frac{263}{26.5} \sqrt{\frac{1}{100}}$													
$\sqrt{\Delta p} = \frac{0.1039}{\sqrt{\Delta p}} \sqrt{\frac{1}{15}} = \frac{263}{2} \sqrt{\frac{1}{15}} = \frac{26.5}{2} \sqrt{\frac{1}{15}}$													
$\sqrt{\Delta p} = \frac{0.1039}{\sqrt{\Delta P}} \sqrt{\Delta H} = \frac{263}{26.5} \sqrt{\frac{1}{1000000000000000000000000000000000$													
Ap = 0.1039 AH = 0.64 V Ts = 263 V													
$\sqrt{\Delta p} = \frac{0.1039}{\sqrt{\Delta P}} \sqrt{\Delta H} = \frac{2.64}{\sqrt{15}} \sqrt{\frac{1}{15}} = \frac{2.63}{2} \sqrt{\frac{1}{100}}$													
Ap = 0.1039 AH = 0.64 V Ts = 263 V													
JAP = 0.1039 AH = 0.64 V Ts = 263 V													
JAP = 0.1039, AH = 0.64 V Ts = 263 V					_		,					\	
	□	Vm =	1.844 √	1p = 0.103		0.640		253			Tm = 26	7.5	4

Environmental Quality Management, Inc.

SAMPLE RECOVERY DATA

Plant Su	off AFB			Run No	-5-3	
Thata 9///	213	Sample Box No.	1>8-1	Job No.		
Sample Lo	cation Lan	Generatur		Filter No	20470	PC013
Train Pren	ACP TOA					
	~	PIL			, <u> </u>	
Comments		M5/ g	Parficle s	5.'Zeu		
Front Half						
Acetone		Liquid				
Container 1	No	Level Marked	Sealed _			
Filter						
Container :	No		Sealed _			
Description	n of Filter					
Samples St	rored and Lock	ed				
bampios D						
Back Half/						
Container 1	No					
Liquid Lev	el Marked		Sealed			
*						
Your Ma	Contonto	Initial Vol		Weight (gra	ms)	
Imp. No.	Contents	(ml)	Initial	Final	Net	
1	DIHZU	(00	734,5	791.8	57.3	V
- 2		100	710.4	673.2	-37,2	
3			623.5	622.4	-1.1	V
4	S6.	250	823.2	836.1	12.9	
5						
6 .						
*	Total .				3/9	V
Description	of Impinger (Catch:	Slightly	loody		,

Kalle



EPA METHOD 30 VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Company:	Scall AFB		City: DFallin Zilivariani Location: MF2 Exhause
Date:	1/10/03		Location: MF2 Exhause
Time:	1328-1428		Run #: 0030-2
Meter #: _	VB-1		Y-Factor:
Barometric	Pressure, in.Hg: 30.	68	Operator: MC
Ambient Te	emperature, °F:		Purge Time:
		Vacuum Leak Chec	c Data
	Initial, in.Hg	Final, in.Hg	Time, min.
Pre-test:			
Post-test			

	Clock	Meter		Dry Gas		
Sample	Time,	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
Time (min)	(24-hr)	(liter)	Setting	(°F)	(in.Hg)	Temp, °F
0	1328	9833,90	0.25	97/97		250
5	1333	9:35.le	0-25	98/98	ì	250
12	1338	9837.	0,25	98/98	ţ	250
15	1343	9838,3	0.25	101/98	1	250
20.	/358	9639.5	0.25	98/98	l	250
25	1358	9840.8	0.25	60 \$100	(250
33	14031358	9842.1	6-25	100/100	1	250
35	14081403	9843.5	0-25	101/101	7	250
40	1413 1408	9844.6	0.25	100/10/	ĺ	250
45	1418 1413	9845.9	0,25	101 /102	٨	250
50	14231418	9847.2	0.25	101/102	/	250
55	1428 1423	9848.5	6.25	103/109	1	256
66	1437 1428	9849.82	0-25	102/103	(250

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{std} = V_{m} (liters) \times Y \times 17.647 \times \frac{P_{b} (in.Hg)}{T_{m} (^{\circ}R)}$$

 V_{std}



EPA METHOD 30 5515 – β AH VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

Company: Scott AFB	City: O'Fullon, Liliusi- Location: MF2 Exhips
Date: 9/10/03	Location: MF2 Exhaps
Time: /328-/928	Run #: 5515 - 2
Meter #:	Y-Factor:
Barometric Pressure, in Hg: 30.68	Operator: asker
Ambient Temperature, °F:	Purge Time:
	m Leak Check Data
Initial, in.Hg Fina	l, in.Hg Time, min.
Pre-test:	
Post-test:	

	Clock	Meter		Dry Gas		
Sample	Time,	Volume,	Rotameter	Meter Temp.,	Vacuum,	Probe
Time (min)	(24-hr)	(liter)	Setting	(°F),	(in.Hg)	Temp, °F
0	1328	35 33.96	0.23	98 /97		NIA
5	1333	5535.7	0.25	100/ 97	1	NA
(0	1343 1338	5537.1	0.25	150 197	t	N/1)
15	1-34-8 1343	5838.5	0.25	98'/99	ĺ	NA
20	1353 1348	5539.8	0,25	101/98	i	NIA
25	1358 1353	5541.2	0.23	101199		NA
30	1403 (358)	5542.8	0.25	102/100		NIB
35	1408 1403	5544.2	0-25	103/100	(NUA
40	14/3 1460	5545.6	0-25	163 /100		NA
45	1418 1413	5546,9	0.25	103/101	ı	N/A.
30	1418	4548, L	0.29	164/101		NIA
55	1427	5549.6	0-25	104/102	1	NA
ان	(428	5551.11	0.25	104/102	1	NA

Nitrogen purge/activated carbon packing in sample holding container:

$$V_{atd} = V_m \text{ (liters)} \times Y \times 17.647 \times \frac{P_b \text{ (in. Hg)}}{T_m ({}^{\circ}\text{R})}$$

 V_{std}

FIELD DATA SHEET

Sample Type: fold Operator: MK
Pbar: 70.68 Ps: 0.01
CO₂: 03:
Probe Length/Type: 2.64mPitot#:
Stack Diameter: 4" As: Run Number: 0011-2 Date: 1/10/1 3

Pretest Leak Rate: 0.00 cfm @ 10 in. Hg.

Pretest Leak Check: Pitot: ____ Orsat: ____ Sampling Location:

Assumed Bws: 4 Filter #: Meter Box #: 8 Y: 1,005 AH@: 1,54 Post-Test Leak Rate: a. oolcfm @ 7 m.Hg. Orsat: __ Nozzle ID: 0.500 Thermocouple #: Post-Test Leak Check: Pitot:

	Time Reading Hand Desired Action Trap (33) Probe Plane Trap	Traverse Sampling	Clock	Gas Meter	Velocity	Q	Α	Stack	Temperature °F	iture °F	Impinger	Dry Gas Me	Dry Gas Meter Temp. Tm	Vacuum
0 725 556.992. 1. 133 56.18	0 732 556.902 063 063 26 75 25 64 60 60 60 60 60 60 60 60 60 60 60 60 60	Time	2	Reading	Head	Desired	Actual	Temp (Ts)	Probe	Filter	Temp. °F	Inlet	Outlet	(ju
135 564, 600 60 60 60 2 26 3 25 250 64 87 81 564, 2 00 108 60 60 3 26 3 25 25 25 6 4 87 8 564, 2 00 108 60 60 3 26 3 26 3 25 25 25 6 4 87 8 564, 2 00 108 60 60 3 26 3 26 3 25 25 25 6 4 87 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	135 54, 6 0.60 0.63 0.63 263 250 64 87 850 86, 6 64 87 850 86, 6 63 8,	_	1325	556.982										
135 541.6	1335 544 & 0.010 & 0.63 0.63 263 269 250 64 87 89 1345 564,2 0.010 & 0.63 0.63 263 263 250 64 87 89 1345 564,2 0.010 & 0.63 0.63 263 263 250 249 64 89 1345 551,0 0.010 & 0.63 0.63 263 263 250 249 64 89 1345 571,0 0.010 & 0.63 0.63 263 263 250 249 57 60 89 145 571,0 0.010 & 0.63 0.63 263 263 250 259 57 60 89 1415 581,4 0.010 & 0.63 0.63 263 263 251 250 57 60 89 1415 581,4 0.010 & 0.63 0.63 263 263 251 250 57 60 89 1415 581,4 0.010 & 0.63 0.63 263 263 251 250 57 60 89 1415 581,4 0.010 & 0.63 0.63 0.63 263 263 250 250 57 60 89 1415 581,4 0.010 &	5	0251	 	3030.0	.0.63		2¢ >	g r	250	ود	20)	18	
1343 564,2 p.0108 0.63 0.63 2.63 2.50 64 97 97 1345 564,1 p.0108 0.63 0.63 2.63 2.51 250 64 97 97 1345 564,1 p.0108 0.63 0.63 2.63 2.63 2.50 2.49 64 97 97 1465 571,6 p.0108 0.63 0.63 2.63 2.63 2.50 2.49 57 60 97 1465 571,6 p.0108 0.63 0.63 2.63 2.63 2.50 2.49 57 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.41 2.49 57 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.41 2.49 57 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.41 2.49 57 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.41 2.49 57 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.50 2.50 58 60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 0.63 2.63 2.63 2.60 97 1415 581,4 p.0108 0.63 0.63 0.63 0.63 0.63 0.63 0.63 0.63	1347 5647 2 p.0108 0.63 0.63 263 250 250 63 97 97 1345 566.9 9 p.0108 0.63 0.63 263 255 250 64 97 97 97 97 950 501 0.008 0.63 0.63 263 263 250 249 64 98 97 97 97 97 97 97 97 97 97 97 97 97 97	0/	SEE!	5/1/2	60100	0,63	0	263	052	250	1	63	36	
1345 546.9 6.008 0.63 26.63 265 250 64 97 9 1350 569.1 6.0008 0.63 0.63 2.63 2.55 249 64 98 9 1455 571,6 6.000 0.63 0.63 2.63 2.50 249 57 60 9 1405 576,6 6.000 0.63 0.63 2.63 2.51 2.50 57 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.51 2.50 57 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 57 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 59 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 59 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 59 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 59 60 9 1415 581.4 6.000 0.63 0.63 2.63 2.50 2.50 59 60 9	1345 546.9 6.068 0.63 26.63 265 269 64 97 9 1350 569.1 2.0108 0.63 0.63 263 265 249 64 98 9 1350 569.1 2.0108 0.63 0.63 2.63 2.63 2.50 249 64 98 9 1354 571,6 2.0108 0.63 0.63 2.63 2.50 249 57 00 9 1405 576.6 2.0108 0.63 0.63 2.63 2.51 250 59 1415 581.4 2.0108 0.63 0.63 2.63 2.51 250 59 1415 581.4 2.0108 0.63 0.63 2.63 2.50 2.50 59 1425 586.370 0.0108 0.63 0.63 2.63 2.50 2.50 58 0.01 9 1425 586.370 0.0108 0.63 0.63 2.63 2.50 2.50 58 0.01 9 1425 586.370 0.0108 0.63 0.63 2.50 2.50 58 0.01 9 1425 586.370 0.0108 0.63 0.63 2.52 2.50 2.50 58 0.01 9 1425 586.370 0.0108 0.63 0.63 0.63 0.53 0.53 0.53 0.53 0.53 0.53 0.53 0.5	6)	1340	\ \	80/00	0,63	0.63	263	2 %	250	63	6	S.	
1350 569.1 0.0108 0.163 0.63 2.63 2.56 2.49 6.4 78 125, 125, 125 2.51 125, 125, 125 2.51 125, 125, 125, 125 2.51 125, 125, 125, 125, 125, 125, 125, 125,	1350 569.1 0.0108 0.63 2.63 2.63 2.50 249 64 78 1455 571,6 6.0108 0.63 2.63 2.63 2.50 2.49 57 20 7 7 1,6 6.0108 0.63 2.63 2.63 2.50 2.49 57 20 7 7 1,6 5.0108 0.63 2.63 2.63 2.51 2.50 57 20 7 7 1,4 15 581.4 0.0108 0.63 2.63 2.63 2.47 2.49 57 20 1 9 1 14 15 581.4 0.0108 0.63 2.63 2.63 2.47 2.49 57 20 1 9 1 14 15 581.4 0.0108 0.63 2.63 2.63 2.63 2.50 57 20 1 9 1 14 15 581.4 0.0108 0.63 2.63 2.63 2.50 2.50 58 20 1 9 1 14 15 581.4 0.0108 0.63 2.63 2.63 2.50 2.50 58 20 1 9 1 14 15 581.4 0.0108 0.63 2.63 2.63 2.50 2.50 58 20 1 9 1 14 15 581.4 0.0108 0.63 0.63 2.63 2.63 2.50 2.50 58 20 1 9 1 14 15 1	10	5461		80/019	1	6.90	763	152	250	64	67	20	_
1455 571,6 6,010 & 0.63 2.63 2.63 2.50 2.79 57 60 1465 574,1 0.010 & 0.63 2.63 2.63 2.50 2.79 57 60 1465 576,6 0.63 0.63 2.63 2.51 2.50 58 60 0.00 1465 576,6 0.63 0.63 2.63 2.51 2.50 57 60 1475 581,4 0.010 0.63 0.63 2.63 2.47 2.49 5.7 60 1475 581,4 0.010 0.010 0.01 0.03 2.63 2.47 2.49 5.7 60 1475 581,0 0.010 0.01 0.01 2.63 2.63 2.50 58 60 10 10 10 10 10 10 10 10 10 10 10 10 10	146 574, 6 6000 0.63 263 263 250 249 57 60 1465 574, 6 6000 0.63 0.63 263 251 250 249 57 60 1465 574, 6 6000 0.63 0.63 263 251 250 59 60 1415 581, 4 6000 0.63 0.63 263 247 249 57 101 1415 581, 4 6000 0.63 0.63 263 247 249 57 101 1425 584, 0 6.000 0.63 0.63 263 247 249 57 101 1425 584, 0 6.000 0.63 0.63 263 250 250 59 101 1425 586, 370 0.000 0.63 0.63 26 3 25 25 57 101 1425 586, 370 0.000 0.63 0.63 26 3 25 25 59 101 1426 584, 370 0.000 0.63 0.63 26 3 25 25 25 25 25 25 25 25 25 25 25 25 25	25	1350	569.1	8010.0	0,63	0,63	263	256	642	70	8/8	26	_
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1412 579.1 6.0108 0.63 263 267 250 57 101 1415 581,4 0.0108 0.63 0.63 263 247 249 57 101 142 5840 6.0108 0.63 0.63 263 250 55 60 1435 586.370 0.0108 0.63 0.63 263 263 250 58 101 1435 586.370 0.0108 0.63 263 263 250 58 101 1435 586.370 0.0108 0.63 263 263 250 58 101 1435 5840 0.108 0.108 17= 9.108 17	1410 579.1 6.0108 0.63 0.63 263 247 249 57 101 1415 581.4 0.008 0.63 0.63 263 247 249 57 101 1425 584.0 6.0108 0.63 0.63 263 250 250 58 7 601 1425 586.3700.0108 0.63 0.63 263 250 250 58 701 1425 586.3700.0108 0.63 0.63 263 250 250 58 701 20m = 24.42 8/4p = 0.1029 AH = 0.63 15 = 2.03 1	95	1465	576,(80/00	690	0.63	263	152	250	58	90	<i>G</i>	
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1425 586.370 0.008 0.003 2.63 2.63 2.69 5.80 5.80 5.80 5.80 5.80 5.80 5.80 5.80	1475	\$5	02.5/	-	6.0/08		0.63	263	250	252		9	98	_
$\sqrt{\frac{\lambda}{m}} = \frac{34}{48} \frac{48}{6\sqrt{n}} = 0.103 \sqrt{\frac{1}{15}} = 0.03 \frac{1$	$\Delta V_{m} = 24.44 \frac{R_{\Delta p}}{\sqrt{2}} = 0.1029 \sqrt{\frac{1}{15}} = 2.02 \sqrt{\frac{1}{$	09)	1425	5.96.370		7	0.63	263	×	052	l. I	101	88	_
29 42 E/n= 0.103 V Tr = 9 1025	29. 42 8/4p = 0.1029 VI = 0.63 VI = 2.02 V					-								•
29 42 B/n= 0.1030 VII = 0.103	29.42 8/AP = 0.1030 AH = 0.63 V TS = 2.62 V													
29 42 E/n= 0.1030 VII = 0.103	24.42 8/4p = 0.1020 / AH = 0.62 V TS = 2.62 V													
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29 42 Elin = 0.1030 VII = 0.103 VII = 0.10	24.42 8/4p = 0.1020 / AH = 0.63 V TS = 2.62 V													
29 42 B/n = 0.1030 VH = 0.103 VTc = 9 1025	29.42 Q/Dp = 0.1030 VH = 0.63 VIS = 2.62 V													
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29 42 B/n = 0.1030 VH = 0.103 VTc = 9 102 V	29.42 B/Ap = 0.1030 AH = 0.63 V TS = 2.62 V													
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29 42 8/n= 0.1030 NH = 0.109 VTG = 9 102 V	29. 42 8/4p = 0.1020 AH = 0.63 V TS = 2.62 V													
		-		4	0.0	\$ \frac{1}{2}	20,00	7-0	1001			7 0 8	MY	



SAMPLE RECOVERY DATA

Plant Se	T ATTS			Run No. <u>66</u>	11-2			
Date 9/	10/63	Sample Box No 2 Extuse	SB-3	Job No. 03	0174.006.002			
Sample Lo	ocation MF	2 Extuse		Filter No.	NIA			
Train Prep	parer 10 ·	4 / KK		,				
Sample Re	ecovery Person	DA/RK,						
Comment	S	Aldebya	1/ Kelove	fratu				
		/						
Front Half								
Acetone		Liquid		•				
Container	No	Level Marked	Sealed_					
Filter								
Container	No		Sealed_					
T	C ****							
Descriptio	n of Filter			•				
Commiss C	1 T	. 1						
Samples 2	roled and Pock	ed						
Back Half	Maistana							
Comanci	110.							
Liquid Level Marked Sealed								
mquu no	Of Hallieroof		Statut_					
		Initial Vol		Weight (gra	mal			
Imp. No.	Contents	(ml)	Initial					
	D 5.1			Final				
	DUPIT	100m1	822.7	845,2	22.5			
- 2	DMPH	10021	727.4	728.9	15.			
. 3	DNOH	local	724.9	737741	-0.0			
4	STUTCAGGE		831.5	1247,8	11.3			
5				1010	t+			
6				 				
	Total			 	0 1 -			
					34.5			
Dagarine	CT	DA	13011 1 5	first im	46			
Describion	of Impinger C	atch: 11'U.	UNINATURE (4	سطار ۱۱۱۲۲۶۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱۱	NI NG - P			

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APPENDIX C ANALYTICAL RESULTS



	PROJ	ECT ANALYTICA	L SHEET	(sheet 1 of 2)		
Project Na	me: <u>Sco</u> +	+ AFB	Project No.:	030174.000	6.009	1
Project Da	te(s): _9/8.	- 11/03	Project Manage	er: Gerstle		
Method(s):	.	-	No. of Sites:			
RUN NO.	ID NO.	#/DESCRIPTION	TARE MASS	FINAL MASS	NET MASS	
10-5-1	2003-353	Filter 830573	338,36 342-1 pk	350.55	12.2	
10-5-1	-354	Acetone 774	107 099. 3	107,110:95	10.75 11.0	15 VA
10-2	-355	Filter PCD25	53.55	59.45	5.9	
10-2	-356	Acetone 854	108,675.35	108,687.1	11,75 /	1
10-3	-357	Filter 830574	339.0	347.45	8,45	1
10-3	-358	Acetore 771	108,116.8	108,130.6	13.8	
25-1	-359	Filter 830572	340.3	353,15	12.85	1
25-1	-360	Acetone 767	110,129.95	110,153.55	23.6e	
25-2	-361	Filter PCO26	53,8	59.65	5.85	4
25-2	-369	Acctone 512	115,633.8	115,656.65	22.85 L	
25-3	-36}	Filter 830556	339.95	351.9	11.95 1	
25-)	-369	Acetone 360	114,787.6	114,803,1	15.5 V	
50-1	-365	Filter 830557	336.75	353.15	16,4	,
50-1	-366	Acetone 663	107,612.0	107,637.7	25.7 V	
50-2	-367	Filter PC016	55.2	57.75	2.55]
50-0	-362	Acetone 519	109.350.55	109,363.4	12.85 V	
50-3	-369	Filter 830558	339.3	<i>353.</i> 35	14.05	
50-3	-320	Acetone 555	115,305.8	115,340.5	34.7 V	<u> </u>
75-1	-37/	Filter 830559	338. <i>05</i>	388.6	50,55 V	
75-1	~37)	Acetone 589	114,929.9	114,953,05	28.15 V	
75-2	-373	Filter PC 019	54.3	57.9	3.6	
75-2	-374	Acetone 615	108,073 65	' ' '	11.9	1
75-3	-375	Filter 830445	256.1	2 65.3	.9.2 /	



				·	
	PROJE	CT ANALYTICAL	SHEET (sheet <u>2</u> of <u>2</u>)
RUN NO.	ID NO.	#/DESCRIPTION	TARE MASS	FINAL MASS	NET MASS
75-3	-376	Acetone 626	114, 422.9	114,440.35	17.45 V
100-1	-377	Filter 830455	254.4	257,15	2.75
100-1	- 378	Acetone 773	109,944.85	109,953.7	8.85 V
100-9	-379	Filter PCD17	54.9	59.55	4.65 V
100-2	-380	Acetone 772	109,872.7	109,878.2	5.5 V
100-3	- 38/	Filter 830502	338.65	342.3	3,65 V
100-3	-382	Acetone 793	109,555,15	109,564.35	9.2 V
100-4	-383	Filter 83053a	337.45	340,8	3.35 V
100-4	-384	Acetone 755	108,486.6	108,495.4	8.8 V
L-1	-385	Filter 830533	337. 5	345.05	7.55 V
L-1	-386	Acetone 665	108,450.1	108,457.5	5.4 V
L-9	-387	Filter 830527	339. 25	347.0	7.75 V
L-9	-388-	Acetone 660	110,426.35	1/0,430.8	4.45 V
4-3	-389	Filter PC 013	55.8	62,45	6.65 V
1-3	-390	Acetone 783	108,887.25	108,891.6	4.35 V
Blank	-391	Blank Filter 830470	257.9	258.1	0.2
Blank	-372	Blank Filter PC	49.8	55.0	0.2
Blank	-393	Blank Acetone 759	109,000.05	109,003.45	1.2 V



First Analytical Laboratories 1126 Burning Tree Dr. Chapel Hill, NC 27517

Tel. (919) 942-8607 FAX (919) 929-8688 www.firstanalyticallabs.com

ANALYSIS REPORT

CONDENSIBLE PARTICULATE WEIGHT

Project #: 30912

Report Date: 22-Sep-03

Client: Environmental Quality Management

Date Received: 16-Sep-03

Client Project ID: 030174.0006.002

Sample	ID	Particulate
Client	FAL	Weight
		mg
TOTALS		
Blank	30912.B	0.4
10-5-1	30912.101	31.6
10-5-2	30912.102	26.2
10-5-3	30912.103	31.3
25-5-1	30912.251	27.8
25-5-2	30912.252	23.0
25-5-3	30912.253	35.7
50-5-1	30912.501	44.8
50-5-2	30912.502	10.9
50-5-3	30912.503	46.4
75-5-1	30912.751	41.6
75-5-2	30912.752	8.4
75-5-3	30912.753	53.6
100-5-1	30912.1001	37.5
100-5-2	30912.1002	3.7
100-5-3	30912.1003	55.4
100-5-4	30912.1004	45.3
L-5-1	30912.L1	25.7
L-5-2	30912.L2	20.4
L-5-3	30912.L3	28.6



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ANALYSIS REPORT

CONDENSIBLE PARTICULATE WEIGHT

Project #: 30912

Client: Environmental Quality Management

Client Project ID: 030174.0006.002

Report Date: 22-Sep-03 Date Received: 16-Sep-03

Sample ID Final **Particulate** Tare FAL Client Weight Weight Weight mg g **ORGANIC FRACTION** MeCI2 Blank 30912.OB 4.3643 4.3647 0.4 10-5-1 4.3797 4.3920 30912.0101 12.3 10-5-2 30912.0102 4.3745 4 3867 12.2 10-5-3 30912.O103 4.3586 4.3710 12.4 25-5-1 30912.0251 4.3669 4.3794 12.5 25-5-2 10.7 30912.0252 4.3624 4.3731 25-5-3 30912.0253 4.3575 4.3695 12.0 50-5-1 30912.O501 4.3541 4.3654 11.3 50-5-2 30912.O502 4.3506 4.3540 3.4 50-5-3 30912.O503 4.3326 4.3452 126 75-5-1 30912.0751 1.9 4 3639 4.3658 75-5-2 30912.0752 4.2115 4.2142 2.7 75-5-3 4.2529 4.2699 170 30912.0753 100-5-1 30912.01001 13.2 4.3636 4.3768 100-5-2 30912 O1002 4.3419 4.3436 1.7 100-5-3 30912.01003 4.3653 4.3716 6.3 100-5-4 30912.01004 4.3604 4.3707 10.3 L-5-1 30912.OL1 4.3804 4.3839 3.5 L-5-2 30912.OL2 4.3544 4.3565 2.1 L-5-3 30912.OL3 4.3764 4.3804 4.0



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ANALYSIS REPORT

CONDENSIBLE PARTICULATE WEIGHT

Project #: 30912

Client: Environmental Quality Management

Client Project ID: 030174.0006.002

Report Date: 22-Sep-03

Date Received: 16-Sep-03

Sample ID		Tare	Final	Particulate
Client	FAL	Weight	Weight	Weight
		g	g	mg
AQUEOUS FR	ACTION			
H2O Blank	30912.AB	8.4189	8 4169	-2.0
10-5-1	30912.A101	8.3371	8.3564	19.3
10-5-2	30912.A102	8.2439	8.2579	14.0
10-5-3	30912.A103	8.2186	8.2375	18.9
25-5-1	30912.A251	8.3165	8.3318	15.3
25-5-2	30912.A252	8.3577	8.3700	12.3
25-5-3	30912.A253	8.2867	8.3104	23.7
50-5-1	30912 A501	8.3250	8.3585	33.5
50-5-2	30912.A502	8.2465	8.2540	7.5
50-5-3	30912.A503	8.3047	8.3385	33.8
75-5-1	30912.A751	8.4274	8.4671	39.7
75-5-2	30912.A752	8.3250	8.3307	5.7
75-5-3	30912.A753	8.3767	8.4133	36.6
100-5-1	30912.A1001	8.3255	8.3498	24.3
100-5-2	30912.A1002	8.3928	8.3948	2.0
100-5-3	30912.A1003	8.3112	8.3603	49.1
100-5-4	30912.A1004	8.3945	8.4295	35.0
L-5-1	30912.AL1	8.4313	8.4535	22.2
L-5-2	30912.AL2	8.3744	8.3927	18.3
L-5-3	30912.AL3	8.2110	8.2356	24.6

Reference Document No. _

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (orn (

Report to:

Lab Destination Eab Contact/Phone Eab Contact/Phone Lab Purchase Order No.

Scott Air Fore Pas

Project Name Project Number

030174,0006,002

Project Manager Sample Team Leader

-86 Gewnator + MF2

Environmental Quality Management, Inc.

E O Carrier/Waybill No.

Page 1 of



Environmental Quality Management, Inc.

Bill to: Sawa-	Sample Description/Type Date/Time Container Sample Pre- Collected Type Volume servative	Medicines 4000 9/8/03 (Lan/Malgar UNIX 689 Method 202 for	" Buchusable Fartice		1/1	lions:	d identification: Flammable [] Skin Irritant Other (mos.)	QA Requirements:	1. Received by Kon Kelde. Date: 9/12/02 1. Received by While Ol. Date: 9/16/03 Isation) R. M. W. Time: (Signature/Affiliation) P. A. Time: 10:304m.	Date: 2. Received by Time: (Signature/Affiliation)	
	Sample Number Sample I	T	10-5-4	+	И с. 1	Special Instructions:	Possible Hazard Identification: Non-hazard 🛭 Flammable 🗓 Skin Irritant 🥦 Ott	Turnaround Time Required: Normal M Rush [] Results Required by	1. Relinquished by Kon Kull. (Signature/Affiliation) RU V WILL	2. Relinquistied by (Signature/Affillation)	Comments:

N:\Forms\Forms\Emission Testing\Chain of Custody.doc

Environmental Quality Management, Inc. - 86 Cementer are MFZ Lighting Unir

Project Name Scott Air Form Base

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)

_30912

Reference Document No. Page 2 of 2

Project No. 030/7% 06. 602

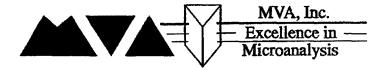
Sample Shipment Date_

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6 October 2003

Mr. Tom Gerstle Environmental Quality Management 1800 Carillon Blvd. Cincinnati, OH 45240

Dear Mr. Gerstle,

Enclosed is our report of results for the particle size distribution and description of particle morphology of seven samples plus a field blank. If you have any questions, please do not hesitate to contact me.

Thank you for consulting MVA, Inc. We will retain your samples for thirty (30) days prior to disposal.

Sincerely,

Tim B. Vander Wood, Ph.D.

Executive Director

Enclosure

Report of Results: MVA5735

Particle Size Distribution EQ Project Name: Scott AFB

Prepared for:

Environmental Quality Management 1800 Carillon Blvd. Cincinnati, OH 45240

Prepared by:

MVA, Inc. 5500 Oakbrook Parkway, Suite 200 Norcross, GA 30093

Respectfully Submitted by:

Tim B. Vander Wood, Ph.D. Executive Director

6 October 2003

5735report100603.doc



5500 Oakbrook Parkway #200 Norcross, GA 30093 770-662-8509 • FAX 770-662-8532 www.mvainc.com Report of Results: MVA5735

Particle Size Distribution EQ Project Name: Scott AFB

Introduction

On 29 September we received seven samples, including a field blank, along with a request that we determine the particle size distribution of the samples as well as provide a description of the particle morphology. Documentation accompanying the samples indicated they were from EQ Project 030174.0006.002, Scott AFB. Upon receipt in our laboratory, the samples were assigned MVA samples numbers as follows:

EQ Sample Number	MVA Sample Number
10-5-2	5735N1542
25-5-2	5735N1543
50-5-2	5735N1544
75-5-2	5735N1545
100-5-2	5735N1546
L-5-3	5735N1547
Blank	5735N1548

Analyses were carried out during the period 29 September through 3 October.

Methods

Each filter was examined under a stereomicroscope at magnifications up to 40X. Particles from each sample were redispersed and analyzed in automated mode in a JEOL 6400 scanning electron microscope (SEM) equipped with a Noran Voyager energy dispersive x-ray spectrometer and digital imaging and automation system. Additional portions of each sample were prepared and imaged in our JEOL 1200EX transmission electron microscope (TEM) equipped with a Scientific Instruments digital imaging system. Samples were prepared for TEM using a modified form of ASTM 6602. Particle size measurements were made from the TEM images using NIH Image software.

Results and Discussion

Visual inspection of the filters and examination under the stereomicroscope indicated that they were heavily loaded with a black particulate. Initial SEM examination indicated that most of the particulate was soot, including aciniform soot aggregates. However, a significant population of non-carbon particles was also present.

Non-carbon particles were sized in the SEM and Tables 1 and 2 contain the results of those measurements. Table 1 presents the particle size distribution by number of non-carbon particles in each size class. Table 2 presents the estimated mass on non-carbon particles in each size bin, based on the assumption that all of the particles are of equal density.

Transmission electron microscope images of typical carbon particles in each sample (except the blank) are included as Figures 1 through 12. These particles are consistent with aciniform soot, and are composed of fragile aggregates of individual particles. The fundamental particle size of the soot is the size of the "grapes" making up the aggregate "bunches," and Table 3 contains the results of manual sizing of approximately 50 fundamental soot particles from each sample. The mean soot particle diameter is on the order of 25 nm for all samples.

5735report100603.doc Page 3 of 10

Table 1. Percentage of Number of Non-Carbon Particles in Various Size Ranges

EQM Sample Number: MVA Sample Number:	10-5-2 N15 4 2	25-5-2 N1543	50-5-2 N1544	75-5-2 N1545	100-5-2 N1546	L-5-3 N1547	Blank N1548
Average Diameter (µm)							
0.5-2.5	80.47	83.96	84.51	82.14	84.50	89.40	91.36
2.5-5.0	14.63	12.00	11.79	13.85	13.18	8.61	4.94
5.0-7.5	3.62	2.78	2.31	2.43	1.55	1.66	2.47
7.5-10	0.91	0.87	0.35	0.96	0.00	0.00	1.23
>10	0.38	0.38	1.04	0.62	0.78	0.33	0.00
Total Number of Particles	2099	1833	865	1769	129	302	81

Table 2. Percentage of Estimated Mass of Non-Carbon Particles in Various Size Ranges

EQM Sample Number: MVA Sample Number:	10-5-2 N1542	25-5-2 N1543	50-5-2 N1544	75-5-2 N1545	100-5-2 N1546	L-5-3 N1547	Blank N1548
Average Diameter (µm)					•		
0.5-2.5	9.74	8.27	3.24	7.75	7.54	8.96	12.71
2.5-5.0	23.99	18.92	5.33	18.08	17.78	17.26	9.74
5.0-7.5	24.39	21.55	5.39	14.15	10.18	10.27	38.77
7.5-10	14.26	18.58	2.36	13.66	0.00	0.00	38.78
>10	27.62	32.68	83.68	46.36	64.50	63.52	0.00

Table 3. Carbon Soot Fundamental Particle Size Measurements

EQM Sample Number:	10-5-2	25-5-2	50-5-2	75-5-2	100-5-2	L-5-3
MVA Sample Number:	N1542	N1543	N1544	N1545	N1546	N1547
Diameter (nm)						
Mean	32.0	24.4	38.3	30.7	36.0	28.5
Median	28.7	22.2	37.8	28.2	33.9	26.8
Standard Deviation	12.3	9.2	9.9	9.8	10.4	7.8
Minimum	18.5	12.9	19.3	16.3	20.4	14.8
Maximum	89.1	64.4	63.0	57.8	62.6	51.7
Count	50	57	52	59	53	52

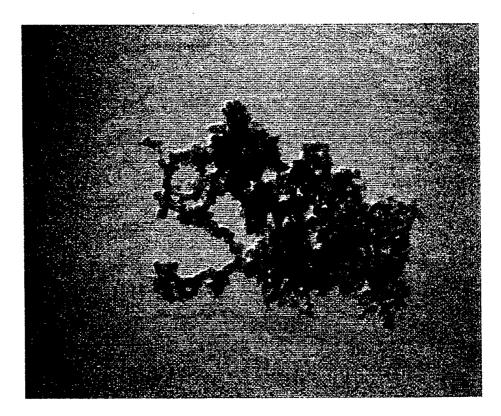


Figure 1. Transmission electron microscope image of aciniform carbon in sample 5735N1542 (10-5-2).

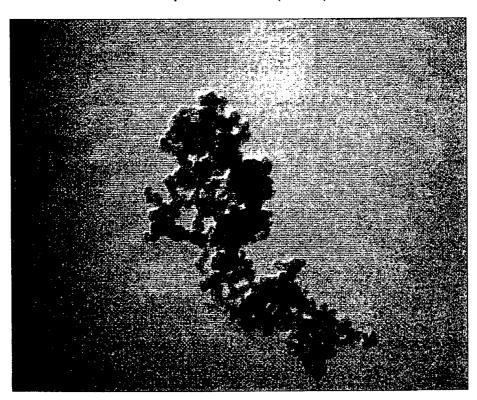


Figure 2. Transmission electron microscope image of aciniform carbon in sample 5735N1542 (10-5-2).

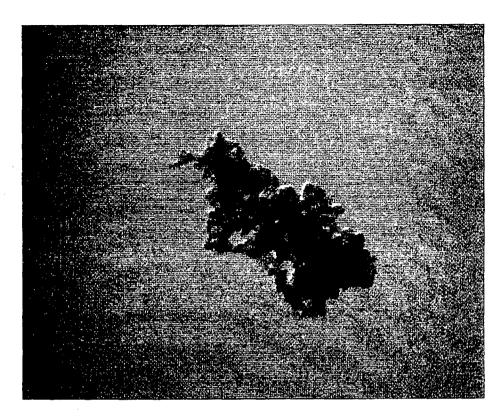


Figure 3. Transmission electron microscope image of aciniform carbon in sample 5735N1543 (25-5-2).

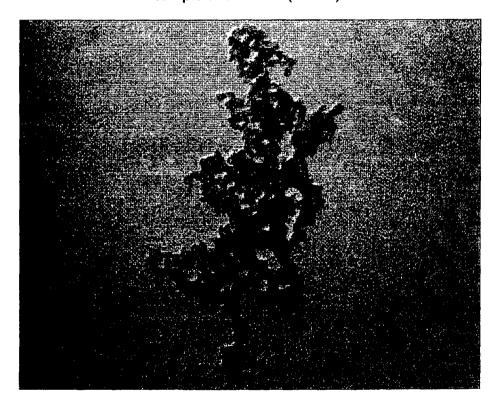


Figure 4. Transmission electron microscope image of aciniform carbon in sample 5735N1543 (25-5-2).

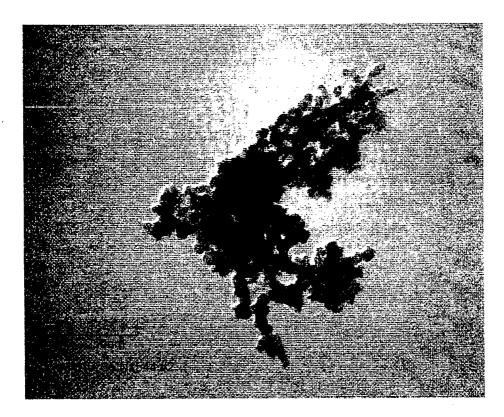


Figure 5. Transmission electron microscope image of aciniform carbon in sample 5735N1544 (50-5-2).

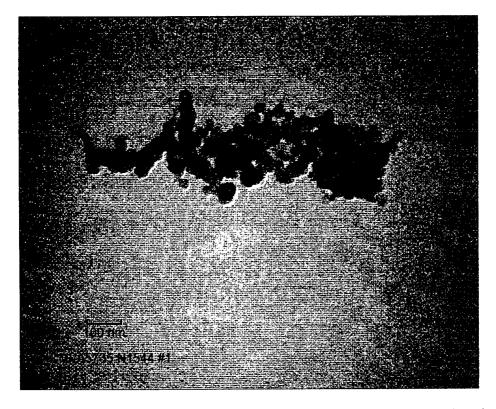


Figure 6. Transmission electron microscope image of aciniform carbon in sample 5735N1544 (50-5-2).

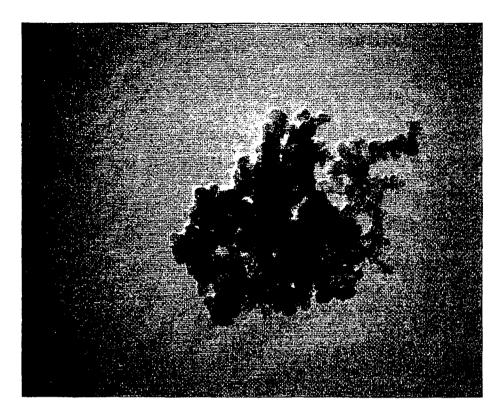


Figure 7. Transmission electron microscope image of aciniform carbon in sample 5735N1545 (75-5-2).

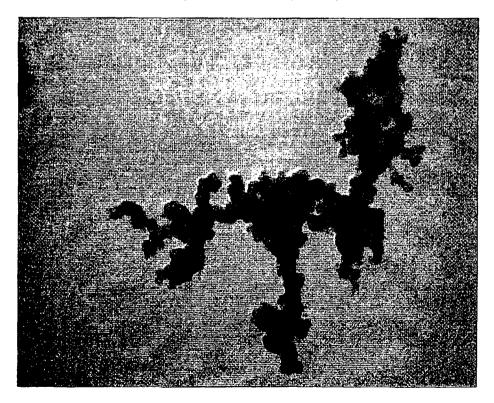


Figure 8. Transmission electron microscope image of aciniform carbon in sample 5735N1545 (75-5-2).

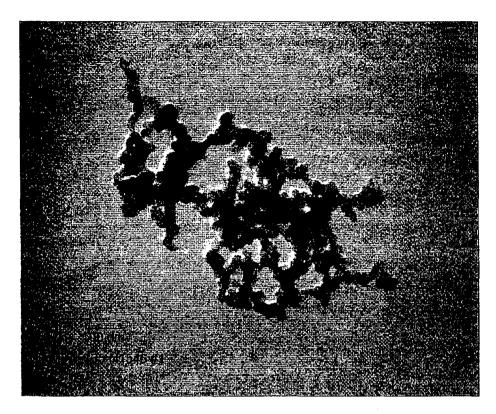


Figure 9. Transmission electron microscope image of aciniform carbon in sample 5735N1546 (100-5-2).



Figure 10. Transmission electron microscope image of aciniform carbon in sample 5735N1546 (100-5-2).



Figure 11. Transmission electron microscope image of aciniform carbon in sample 5735N1547 (L-5-3).

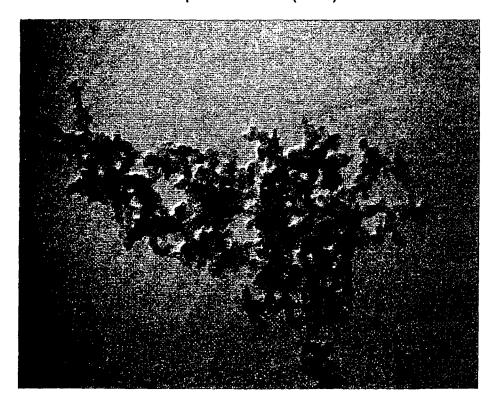


Figure 12. Transmission electron microscope image of aciniform carbon in sample 5735N1547 (L-5-3).

Environmental Quality Management, Inc.

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Reference Document No.	Page 1 of 2

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Report to: 150- Ton	1800 5	Lincing	(5/3/8	Rill to:
Lab Destination MVA, Juc.	ne Tim Vanderwood	to. 6376	40.	
Lab Destinati	Lab Contact/Phone Lim U	Lab Purchase Order No.	Carrier/Waybill No.	
Scot AFB	030(74.0006.002	Tom Gersthe	Ron Kolde	
Project Name	Project Number 03	Project Manager	Sample Team Leader	

1. Obl 45340 25-7500 ex Report to: EQ-Tom Gerste

ONE CONTAINER PER LINE

	Sample	Sample Description/Type	Date/Time Collected	Container Type	Sample	Pre- servative	Requested Analytical Method/(Parameters)	Condition on Receipt (Lab)
17.55	1/8	2 Cachant C. W # 1925 9/86	9/8/03	fetri	(In Known	NIA	Particle size	
30	1543/25-5-A	· 1 19/00 16/19/0	9/18/03	213 h			distribution by Scanning	
-	St. 50-5-7	2 "PC-016 9/19/03	9/19/03				Electron Microscopy	
V	Cax 75-5-2	1 18/019 9/18/0	9/8/6				(SEM), Particle	
3	100-5-2	3 "90-017	9/10/03		→	→	Morphology	
	3	Special Instructions: Particle size distribution and]	Size M	particle size mosphology) qualitative	valitative	description of particles.	·c/e.s.
	Possible Hazard Identification:	Possible Hazard Identification: Non-hazard 囚 Flammable □ Skin Irritant □ Other] Other		Sample Disposal: Return to Client	Olspo	al by Lab 🔀 Archive	(д (mos.)
	Turnaround Time Required: Normal X Rush Res	Turnaround Time Required: Normal 🔯 Rush 🔲 Results Required by		QA Requirements:	ments:			\$\tau_{\text{\tin}\text{\tett}\tint{\text{\text{\text{\text{\text{\text{\text{\text{\text{\tin\text{\tin}\text{\text{\text{\tex{\text{\text{\text{\text{\text{\texi}\text{\text{\text{\text{\text{\texi}\text{\text{\text{\texi}\text{\text{\texi}\text{\text{\texi}\text{\text{\texi}\text{\texi}\text{\texi}\text{\texi}\text{\texi}\text{\texi}\text{\texi}\text{\texi}\text{\texi}\tex
	1. Relinquisher (Signature/Affiliation)	1. Relinquished by Ron Kolder (Signature Affiliation) 2011 Pholib	Date: 9/: Time:	60/077/6	1. Received by (Signature/Affiliation) 1	J. D.	MUNT Time:	3/52/03 10.45
	2. Relinquished by (Signature/Affiliation)	j by	Date: Time:		2. Received by (Signature/Affiliation)		Date: Time:	
	Comments:	Comments:		-45.0 km	2) 5.0-7,5 MM	-5% (4 11	2.5-45.0 Mm 3) 5.0-75 Mm 4) 7.5-410.0 Mm	W.
-	1 2 2 V		1					

Project No. 030/74.006,002 ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.) 語記 -86 common MF2 testing **Environmental Quality** Management, Inc. Project Name Scott AFB

Reference Document No. 3/// Page 2 of 2

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Sample Shipment Date 9/26/03

ONE CONTAINER PER LINE

Unkrown N/A	Unkrown N/A	Jeti Dish Unknown N/A	9/10/03 Jetri Dish Unkrown N/A	9/10/03 Petri Dish Unknown N/A	9/10/03 Hetri Distr 14th moun	0/12 /2.01	9/10/03 Petri Dish Unknown NIA	3 9/10/03 Petri Dish Unknown N/A	9/10/03 Petri Dish Uniternan N/A
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Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- · Work order Summary;
- Laboratory Narrative;
- · Results; and
- Chain of Custody (copy).



WORK ORDER #: 0309225

Work Order Summary

CLIENT:

Mr. Tom Gerstle

BILL TO:

Mr Tom Gerstle

Environmental Quality Management,

Environmental Quality Management, Inc.

1800 Carillon Boulevard

1800 Carillon Boulevard Cincinnati, OH 45240

Cincinnati, OH 45240

PHONE: FAX:

800-229-7495 x 251

P.O. # 6169

030174 0006.002 Scott AFB

DATE RECEIVED:

513-825-7495 09/12/03

PROJECT# CONTACT:

DeDe Dodge

DATE COMPLETED:

09/21/03

TEST

FRACTION# NAME 0030-1 01A 01B 0030-1 0030-2 02AB 0030-FB 03AB 0030-RB 04AB Lab Blank 05A

Modified VOST 5041A/8260B Modified VOST 5041A/8260B Modified VOST 5041 A/8260B Modified VOST 5041 A/8260B Modified VOST 5041A/8260B Modified VOST 5041 A/8260B

06A

LCS

Modified VOST 5041 A/8260B

CERTIFIED BY-

Sinda d. Fruman

09/25/03 DATE:

Laboratory Director

Certification numbers: AR DEQ, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004 NY NELAP - 11291, UT NELAP - 9166389892

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/03, Expiration date: 06/30/04

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000 . (800) 985-5955 FAX (916) 985-1020

LABORATORY NARRATIVE VOST 5041A

Environmental Quality Management, Inc. Workorder# 0309225

Two VOST Tube and three VOST Pair samples were received on September 12, 2003. The laboratory performed the analysis via EPA SW-846 Method 5041A using GC/MS in the full scan mode. VOST sorbent tubes are thermally desorbed at 180 degrees centrigrade for ten minutes by UHP helium carrier gas. The gas stream is then bubbled through 5 mL of organic free water and trapped on the sorbent trap of the purge and trap system. The trap is thermally desorbed to elute the components into the GC/MS system for further separation. See the data sheets for the reporting limits for each compound.

Requirement	VOST 5041A	ATL Modifications
Batch Certification	Blanks from the same media as samples	Analysis of set of cartridges prior to onset of any project; Sampling media provided by the client is batch certified ahead of time, only if client provides blank cartridges.
Method blank	Cartridges from the same media batches as the samples	Media batch is certified prior to use in the field. Method Blank is used to certify instrument is contaminant free
Connection between cartridge thermal desorption apparatus & sample purge vessel	PTFE 1/16" Teflon tubing	Heated, 1/16" silica lined stainless steel tubing
Calibration Criteria for non-CCCs	RSD <= 15 % for all non-CCCs	RSD = 30 % for some compounds: Acetone, Bromoform, Vinyl Acetate, Bromomethane, Chloromethane, 1,1,2,2-Tetracholoroethane, & 1,2,3-Trichloropropane</td

Receiving Notes

A Temperature Blank was included with the shipment. Temperature was measured and was not within 4 +/-2 degrees C. Coolant in the form of blue ice was present. The client was notified via the login fax/email and the analysis proceeded.

Analytical Notes

The recovery of internal standard Fluorobenzene and Chlorobenzene-d5 in sample 0030-2 was outside control limits. It is not possible to re-run to confirm matrix or dilute for matrix using sorbent tube media. Data is reported as qualified.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank or tube certification greater than reporting limit (background subtraction not performed).
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.
- N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates

as follows:

a-File was requantified

b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

SAMPLE NAME: 0030-1 ID#: 0309225-01A

		cilection (Spin)
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Chloromethane	10	Not Detected
/inyl Chloride	10	Not Detected
Bromomethane	10	Not Detected
Chloroethane	10	Not Detected
reon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
reon 113	10	Not Detected
Carbon Disulfide	10	Not Detected
Acetone	50	740
3-Chloropropene	10	Not Detected
Methylene Chloride	10	350
rans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
lexane	10	100
,1-Dichloroethane	10	Not Detected
/inyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
sis-1,2-Dichloroethene	10	Not Detected
-Butanone (Methyl Ethyl Ketone)	50	190
Bromochloromethane	10	Not Detected
Chloroform	10	Not Detected
,1,1-Trichloroethane	10	Not Detected
Carbon Tetrachloride	10	Not Detected
,1-Dichloropropene	10	Not Detected
Benzene	10	1500 E
,2-Dichloroethane	10	Not Detected
richloroethene	10	Not Detected
,2-Dichloropropane	10	Not Detected
Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
is-1,3-Dichloropropene	10	Not Detected
rans-1,3-Dichloropropene	10	Not Detected
-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
oluene	10	740
,1,2-Trichloroethane	10	Not Detected
etrachloroethene	10	Not Detected
,3-Dichloropropane	10	Not Detected
-Hexanone	50	Not Detected
Dibromochloromethane	10	Not Detected
Chlorobenzene	10	Not Detected
,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: 0030-1 ID#: 0309225-01A MODIFIED VOST 5041A/8260B

		DIBERROY 97340 ATRIVISE 2/17/02 06:20/PM
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Ethyl Benzene	10	440
m,p-Xylene	10	820
o-Xylene	10	350
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachioroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	230
cis-1,4-Dichloro-2-butene	50	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
trans-1,4-Dichloro-2-butene	50	Not Detected
Propylbenzene	10	360
2-Chlorotoluene	10	Not Detected
4-Chlorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	240
tert-Butylbenzene	10	Not Detected
1,2,4-Trimethylbenzene	10 ·	800
sec-Butylbenzene	10	320
p-Cymene	10	170
1,2-Dibromo-3-chloropropane	50	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	480
Hexachlorobutadiene	50	Not Detected
1,2,3-Trichlorobenzene	50	Not Detected
1,1,1,2-Tetrachloroethane	10	Not Detected
Butylbenzene	10	Not Detected
lodomethane	10	Not Detected
Freon 12	10	Not Detected

E = Exceeds instrument calibration range

Container Type: VOST Tube

		Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	93	70-130
1,2-Dichloroethane-d4	99	70-13 0
Toluene-d8	98	70-130
4-Bromofluorobenzene	111	70-130

SAMPLE NAME: 0030-1

ID#: 0309225-01B

		ellection 98/02
		GIAVAS A 1703 CO COLOR
Compound	Rpt. Limit (ng)	Amount (ng)
Chloromethane	10	Not Detected
Vinyl Chloride	10	Not Detected
Bromomethane	10	130
Chloroethane	10	Not Detected
Freon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
Freon 113	10	Not Detected
Carbon Disulfide	10	Not Detected
Acetone	50	96
3-Chloropropene	10	Not Detected
Methylene Chloride	10	54
trans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
Hexane	10	Not Detected
1,1-Dichloroethane	10	Not Detected
Vinyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
cis-1,2-Dichloroethene	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	Not Detected
Bromochloromethane	10	Not Detected
Chloroform	10	Not Detected
1,1,1-Trichloroethane	10	Not Detected
Carbon Tetrachloride	10	Not Detected
1,1-Dichloropropene	10	Not Detected
Benzene	10	22
1,2-Dichloroethane	10	Not Detected
Trichloroethene	10	Not Detected
1,2-Dichloropropane	10	Not Detected
Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
cis-1,3-Dichloropropene	10	Not Detected
trans-1,3-Dichloropropene	10	Not Detected
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
Toluene	10	Not Detected
1,1,2-Trichloroethane	10	Not Detected
Tetrachloroethene	10	Not Detected
1,3-Dichloropropane	10	Not Detected
2-Hexanone	50	Not Detected
Dibromochloromethane	10	Not Detected
Chlorobenzene	10	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: 0030-1

ID#: 0309225-01B

	Rpt. Limit	Amount
Compound	(ng)	(ng)
Ethyl Benzene	10	Not Detected
m,p-Xylene	10	18
o-Xylene	10	Not Detected
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachloroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	Not Detected
cis-1,4-Dichloro-2-butene	5 0	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
trans-1,4-Dichloro-2-butene	50	Not Detected
Propylbenzene	10	Not Detected
2-Chlorotoluene	10	Not Detected
4-Chlorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	Not Detected
tert-Butylbenzene	10	Not Detected
1,2,4-Trimethylbenzene	10	Not Detected
sec-Butylbenzene	10	Not Detected
p-Cymene	10	Not Detected
1,2-Dibromo-3-chloropropane	50	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	Not Detected
Hexachlorobutadiene	50	Not Detected
1,2,3-Trichlorobenzene	50	Not Detected
1,1,1,2-Tetrachloroethane	10	Not Detected
Butylbenzene	10	Not Detected
odomethane	10	31
Freon 12	10	Not Detected
Container Type: VOST Tube		
D	a/ 5	Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	98	70-130
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	9 9	70-130
4-Bromofluorobenzene	100	70-130

SAMPLE NAME: 0030-2

ID#: 0309225-02AB

Oll-Backs 1 1981		Gallection: 9/10/03 Analysis::3/17/03/08:42 PM
Compound	Rpt. Limit (ng)	Amount (ng)
Chloromethane	10	Not Detected
Vinyl Chloride	10	Not Detected
Bromomethane	10	11
Chloroethane	10	Not Detected
Freon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
Freon 113	10	Not Detected
Carbon Disutfide	10	Not Detected
Acetone	50	420
3-Chloropropene	10	Not Detected
Methylene Chloride	10	550
rans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
Hexane	10	79
1,1-Dichloroethane	10	Not Detected
Vinyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
cis-1,2-Dichloroethene	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	460
Bromochloromethane	10	Not Detected
Chloroform	10	Not Detected
1,1,1-Trichloroethane	10	Not Detected
Carbon Tetrachloride	10	Not Detected
1,1-Dichloropropene	10	Not Detected
Benzene	10	3400 E
1,2-Dichloroethane	10	Not Detected
Trichloroethene	10	Not Detected
1,2-Dichloropropane	1 0 ·	Not Detected
Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
cis-1,3-Dichloropropene	10	Not Detected
trans-1,3-Dichloropropene	10	Not Detected
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
Toluene	10	1400 E
1,1,2-Trichloroethane	. 10	Not Detected
Tetrachloroethene	10	Not Detected
1,3-Dichloropropane	10	Not Detected
2-Hexanone	50	Not Detected
Dibromochioromethane	10	Not Detected
Chlorobenzene	10	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: 0030-2 ID#: 0309225-02AB MODIFIED VOST 5041A/8260B

pit packetoja (oliemon, 9/000% Indysle 19/17/03/08/42/PM
Compound	Rpt. Limit (ng)	Amount (ng)
Ethyl Benzene	10	520
m,p-Xylene	10	1200
o-Xylene	10	570
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachioroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	210
cis-1,4-Dichloro-2-butene	50	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
rans-1,4-Dichloro-2-butene	50	Not Detected
Propylbenzene	10	390
2-Chlorotoluene	10	Not Detected
I-Chlorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	430
ert-Butylbenzene	10	Not Detected
I,2,4-Trimethylbenzene	10	1400 E
sec-Butylbenzene	10	320
o-Cymene	10	220
1,2-Dibromo-3-chloropropane	50	Not Detected
,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	1700 E
lexachlorobutadiene	50	Not Detected
,2,3-Trichlorobenzene	50	Not Detected
,1,1,2-Tetrachloroethane	10	Not Detected
Butylbenzene	10	Not Detected
odomethane	10	Not Detected

E = Exceeds instrument calibration range.

Container Type: VOST Pair

		Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	88	70-130
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	109	70-130

SAMPLE NAME: 0030-FB

ID#: 0309225-03AB

Lie Name 20 1/2		Control 9/10/08 Analysis 9/19/03/04/17W
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Chloromethane	10	Not Detected
Vinyl Chloride	10	Not Detected
3romomethane	10	Not Detected
Chloroethane	10	Not Detected
Freon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
Freon 113	10	Not Detected
Carbon Disulfide	10	Not Detected
Acetone	50	110
l-Chloropropene	10	Not Detected
Methylene Chloride	10	11
rans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
Hexane	10	Not Detected
1,1-Dichloroethane	10	Not Detected
/inyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
cis-1,2-Dichloroethene	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	Not Detected
3romochloromethane	10	Not Detected
Chloroform	10	Not Detected
1,1,1-Trichloroethane	10	Not Detected
Carbon Tetrachloride	10	Not Detected
1,1-Dichloropropene	10	Not Detected
Benzene	10	22
1,2-Dichloroethane	10	Not Detected
Frichloroethene Trichloroethene	10	Not Detected
1,2-Dichloropropane	10	Not Detected
Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
cis-1,3-Dichloropropene	10	Not Detected
rans-1,3-Dichloropropene	10	Not Detected
1-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
Toluene	10	Not Detected
1,1,2-Trichloroethane	10	Not Detected
Tetrachloroethene	10	Not Detected
1,3-Dichloropropane	10	Not Detected
2-Hexanone	50	Not Detected
Dibromochloromethane	10	Not Detected
Chlorobenzene	10	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: 0030-FB

ID#: 0309225-03AB

		olector: \$44003 navae: 97576364:44-28
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Ethyl Benzene	10	Not Detected
m,p-Xylene	10	Not Detected
o-Xylene	10	Not Detected
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachloroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	Not Detected
cis-1,4-Dichloro-2-butene	50	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
trans-1,4-Dichtoro-2-butene	50	Not Detected
Propylbenzene	10	Not Detected
2-Chlorotoluene	10	Not Detected
4-Chlorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	Not Detected
tert-Butylbenzene	10	Not Detected
1,2,4-Trimethylbenzene	10	Not Detected
sec-Butylbenzene	10	Not Detected
p-Cymene	10	Not Detected
1,2-Dibromo-3-chloropropane	50	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	Not Detected
Hexachlorobutadiene	50	Not Detected
1,2,3-Trichlorobenzene	50	Not Detected
1,1,1,2-Tetrachloroethane	10	Not Detected
Butylbenzene	10	Not Detected
odomethane	10	Not Detected
Freon 12	10	Not Detected
Container Type: VOST Pair		BB . 41
Surrogates	%Recovery	Method Limits
Dibromofluoromethane	100	70-130
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	101	70-130
I-Bromofluorobenzene	98	70-130

SAMPLE NAME: 0030-RB

ID#: 0309225-04AB

MODALIA	VOS1 5041A/8260B	
Function of the state of the st		Soffermani 39/10/03 Analysis 59/77/02 (55/19 FM)
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Chloromethane	10	Not Detected
Vinyl Chloride	10	Not Detected
Bromomethane	10	Not Detected
Chloroethane	10	Not Detected
Freon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
Freon 113	10	Not Detected
Carbon Disulfide	10	20
Acetone	50	Not Detected
3-Chloropropene	10	Not Detected
Methylene Chloride	10	28
trans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
Hexane	10	Not Detected
1,1-Dichloroethane	10	Not Detected
Vinyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
cis-1,2-Dichloroethene	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	Not Detected
Bromochloromethane	10	Not Detected
Chloroform	10	Not Detected
1,1,1-Trichloroethane	10	Not Detected
Carbon retractionae	10	Not Detected
1,1-Dichloropropene	10	Not Detected
Benzene	10	Not Detected
1,2-Dichloroethane Trichloroethene	10 10	Not Detected Not Detected
	10	Not Detected
1,2-Dichloropropane Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
	10	Not Detected
cis-1,3-Dichloropropene trans-1,3-Dichloropropene	10	Not Detected
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
Toluene	10	Not Detected
1,1,2-Trichloroethane	10	Not Detected
Tetrachioroethene	10	Not Detected
1,3-Dichloropropane	10	Not Detected
2-Hexanone	50	Not Detected
Dibromochloromethane	10	Not Detected
Chlorobenzene	10	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: 0030-RB

ID#: 0309225-04AB

	Rpt. Limit	Amount
Compound	(ng)	(ng)
Ethyl Benzene	10	Not Detected
m,p-Xylene	10	Not Detected
o-Xylene	10	Not Detected
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachloroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	Not Detected
cis-1,4-Dichloro-2-butene	50	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
trans-1,4-Dichloro-2-butene	50	Not Detected
Propylbenzene	10	Not Detected
2-Chlorotoluene	10	Not Detected
4-Chiorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	Not Detected
ert-Butylbenzene	10	Not Detected
1,2,4-Trimethylbenzene	10	Not Detected
sec-Butylbenzene	10	Not Detected
p-Cymene	10	Not Detected
1,2-Dibromo-3-chloropropane	50	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	Not Detected
Hexachlorobutadiene	50	Not Detected
1,2,3-Trichlorobenzene	50	Not Detected
1,1,1,2-Tetrachloroethane	10	Not Detected
Butylbenzene	10	Not Detected
odomethane	10	Not Detected
Freon 12	10	Not Detected
Container Type: VOST Pair		
	0.4 %	Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	101	70-130
1,2-Dichloroethane-d4	106	70-130
Foluene-d8	95	70-130
I-Bromofiuorobenzene	100	70-130

SAMPLE NAME: Lab Blank

ID#: 0309225-05A

ille Camer (1995) (1995		Xillection: NA Inallysis: 9/17/03/63/54 PM
	Rpt. Limit	Amount
Compound	(ng)	(ng)
Chloromethane	10	Not Detected
Vinyl Chloride	10	Not Detected
Bromomethane	10	Not Detected
Chloroethane	10	Not Detected
Freon 11	10	Not Detected
2-Chloropropane	10	Not Detected
1,1-Dichloroethene	10	Not Detected
Freon 113	10	Not Detected
Carbon Disulfide	10	Not Detected
Acetone	50	Not Detected
3-Chloropropene	10	Not Detected
Methylene Chloride	10	Not Detected
trans-1,2-Dichloroethene	10	Not Detected
Acrylonitrile	10	Not Detected
Hexane	10	Not Detected
1,1-Dichloroethane	10	Not Detected
Vinyl Acetate	50	Not Detected
2,2-Dichloropropane	10	Not Detected
cis-1,2-Dichloroethene	10	Not Detected
2-Butanone (Methyl Ethyl Ketone)	50	Not Detected
Bromochloromethane	10	Not Detected
Chloroform	10	Not Detected
1,1,1-Trichloroethane	10	Not Detected
Carbon Tetrachloride	10	Not Detected
1,1-Dichloropropene	10	Not Detected
Benzene	10	Not Detected
1,2-Dichloroethane	10	Not Detected
Trichloroethene	10	Not Detected
1,2-Dichloropropane	10	Not Detected
Dibromomethane	10	Not Detected
Bromodichloromethane	10	Not Detected
cis-1,3-Dichloropropene	10	Not Detected
trans-1,3-Dichloropropene	10	Not Detected
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	50	Not Detected
Toluene	10	Not Detected
1,1,2-Trichloroethane	10	Not Detected
Tetrachloroethene	10	Not Detected
1,3-Dichloropropane	10	Not Detected
2-Hexanone	50	Not Detected
Dibromochloromethane	10	Not Detected
Chlorobenzene	10	Not Detected
1,2-Dibromoethane (EDB)	10	Not Detected

SAMPLE NAME: Lab Blank

ID#: 0309225-05A

	Rpt. Limit	Amount
Compound	(ng)	(ng)
Ethyl Benzene	10	Not Detected
m,p-Xylene	10	Not Detected
o-Xylene	10	Not Detected
Styrene	10	Not Detected
Bromoform	10	Not Detected
1,1,2,2-Tetrachloroethane	10	Not Detected
1,3-Dichlorobenzene	10	Not Detected
1,4-Dichlorobenzene	10	Not Detected
1,2-Dichlorobenzene	10	Not Detected
Cumene	10	Not Detected
cis-1,4-Dichloro-2-butene	50	Not Detected
Bromobenzene	10	Not Detected
1,2,3-Trichloropropane	10	Not Detected
trans-1,4-Dichloro-2-butene	50	Not Detected
Propylbenzene	10	Not Detected
2-Chlorotoluene	10	Not Detected
4-Chiorotoluene	10	Not Detected
1,3,5-Trimethylbenzene	10	Not Detected
tert-Butylbenzene	10	Not Detected
1,2,4-Trimethylbenzene	10	Not Detected
sec-Butylbenzene	10	Not Detected
p-Cymene	10	Not Detected
1,2-Dibromo-3-chloropropane	50	Not Detected
1,2,4-Trichlorobenzene	50	Not Detected
Naphthalene	50	Not Detected
Hexachlorobutadiene	50	Not Detected
1,2,3-Trichlorobenzene	50	Not Detected
1,1,1,2-Tetrachioroethane	10	Not Detected
Butylbenzene	10	Not Detected
odomethane	10	Not Detected
Freon 12	10	Not Detected
Container Type: NA - Not Applicable		
		Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	100	70-130
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	99	70-130

SAMPLE NAME: LCS

ID#: 0309225-06A

2/1 January 2007 19 July 2007 200 200 200 200 200 200 200 200 20
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Compound	%Recovery
Chloromethane	66
Vinyl Chloride	66
Bromomethane	66
Chloroethane	80
Freon 11	74
2-Chloropropane	Not Spiked
1,1-Dichloroethene	81
Freon 113	Not Spiked
Carbon Disulfide	94
Acetone	85
3-Chloropropene	Not Spiked
Methylene Chloride	74
trans-1,2-Dichloroethene	75
Acrylonitrile	Not Spiked
Hexane	Not Spiked
1,1-Dichloroethane	79
Vinyl Acetate	Not Spiked
2,2-Dichloropropane	75
cis-1,2-Dichloroethene	74
2-Butanone (Methyl Ethyl Ketone)	62
Bromochioromethane	82
Chloroform	82
1,1,1-Trichloroethane	84
Carbon Tetrachloride	84
1,1-Dichloropropene	80
Benzene	81
1,2-Dichloroethane	86
Trichloroethene	89
1,2-Dichloropropane	80
Dibromomethane	79
Bromodichloromethane	82
cis-1,3-Dichloropropene	74
trans-1,3-Dichloropropene	80
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	65
Toluene	86
1,1,2-Trichloroethane	83
Tetrachloroethene	88
1,3-Dichloropropane	84
2-Hexanone	50
Dibromochloromethane	86
Chlorobenzene	88
1,2-Dibromoethane (EDB)	81

SAMPLE NAME: LCS

ID#: 0309225-06A

MODIFIED VOST 5041A/8260B

Compound	%Recovery
Ethyl Benzene	88
m,p-Xylene	91
o-Xylene	90
Styrene	93
Bromoform	8 5
1,1,2,2-Tetrachloroethane	71
1,3-Dichlorobenzene	86
1,4-Dichlorobenzene	88
1,2-Dichlorobenzene	88
Cumene	89
cis-1,4-Dichloro-2-butene	Not Spiked
Bromobenzene	85
1,2,3-Trichloropropane	· 87
trans-1,4-Dichloro-2-butene	Not Spiked
Propylbenzene	85
2-Chlorotaluene	83
4-Chlorotoluene	80
1,3,5-Trimethylbenzene	84
tert-Butylbenzene	84
1,2,4-Trimethylbenzene	85
sec-Butylbenzene	86
p-Cymene	87
1,2-Dibromo-3-chloropropane	78
1,2,4-Trichlorobenzene	91
Naphthalene	114
Hexachlorobutadiene	96
1,2,3-Trichlorobenzene	109
1,1,1,2-Tetrachloroethane	92
Butylbenzene	83
odomethane	Not Spiked
Freon 12	79

Container Type: NA - Not Applicable

		Method
Surrogates	%Recovery	Limits
Dibromofluoromethane	98	70-130
1,2-Dichloroethane-d4	108	70-13 0
Toluene-d8	104	70-130
4-Bromofiuorobenzene	99	70-130

Environmental Quality Management, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

0309225

Reference Document No. A- 3107 Page 1 of _______

	Report to: Town (sers) fla, EQ	1800 Carillow Blyd	PANCIANATIOH 45240	800-239-9475	Same
Page 1 of	Air Toxics	Lab Contact/Phone De. 10 100 116-185-1000	6/69		- :0 III:0
Generation Testing	AFB Lab Destination	603	Gerstle Lab Purchase Order No.	Holde CarrierWaybill No.	
-84 GE	Project Name Scott	Project Number 030/7£expla.	Project Manager	Sample Team Leader Kan	

ONE CONTAINER PER LINE

	Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre-	Requested Analytical Method/(Parameters)	Analytical rametera)	Condition on Receipt (Lab)
NA K	CAP 0030-1	Tener, Tenet / Charcook	- 50/0//6	Sless	N/A	Lee	EPA Marlina 0030	06.00	
3242	32AC 0030-2	,	20/01/2			- voice	For Volatile Organic	L. Organic	
BAS.	33480030 - FB	<i>1</i> /	60/01/6				Com sould	0	
× 55.	3440 6030 - RB	3	20/01/6	→	7	*			
	Special Instructions:	ions:							
	Possible Hazard Identification:	d Identification:			Sumple Disposal:				
	Non-hazard [E]	Non-hazard 🗹 Flammable 🗌 Skin Irritan 🖰	Other		Refurn to Client		Disposal by Lab	Archive ((mos.)
	Tumaround Time Required:	ne Required:		OA Requirements:	rients:				
	Normal 🔀 Ru	Normal M Rush Results Required by		As F	As per Pertual	90 30			
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1. Relinquisher	1. Relinquished by Ray Kolde		9/11/03	1. Received by			Dale:	
	Signature/Affilation	Full of Follow	Time:		Elgranue:Affliation!	į		Типе.	
	2. Relinquished by	by '	Cate:		2. Received by	Laus	James of Money Ime		9/12/03
								0	9
	Comments:	CUSTODY SEAL INTACT?	(ر		_				



Air Toxics Ltd. Introduces the Electronic Report

Thank you for choosing Air Toxics Ltd. To better serve our customers, we are providing your report by e-mail. This document is provided in Portable Document Format which can be viewed with Acrobat Reader by Adobe.

This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- Results; and
- · Chain of Custody (copy).

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0309224

Work Order Summary

CLIENT:

Mr Tom Gerstle

BILL TO:

Mr. Tom Gerstle

Environmental Quality Management,

Environmental Quality Management, Inc. 1800 Carillon Boulevard

Cincinnati, OH 45240

1800 Carillon Boulevard Cincinnati, OH 45240

PHONE:

800-229-7495 x 251

P.O. # 6169

FAX:

DATE RECEIVED:

513-825-7495

PROJECT#

030174.0006.002 Scott AFB

DATE COMPLETED:

9/12/03 9/25/03

CONTACT: DeDe Dodge

FRACTION#	NAME
01AB	5515-1
02AB	5515-2
03AB	5515-FB
04AB	5515-RB
05A	Lab Blank
06A	LCS

TEST	
Modifi	ied NIOSH 5515
Modifi	ied NIOSH 5515
Modifi	ied NIOSH 5515
Modifi	ied NIOSH 5515
Modifi	ied NIOSH 5515
Modifi	ied NIOSH 5515

CERTIFIED BY:

Sinda d. Truman

09/25/03

Laboratory Director

Certification numbers: AR DEQ, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004 NY NELAP - 11291, UT NELAP - 9166389892

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/03, Expiration date: 06/30/04

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE Modified NIOSH 5515

Environmental Quality Management, Inc. Workorder# 0309224

Four NIOSH Tubes XAD-2 w/Filter samples were received on September 12, 2003. The laboratory performed the analysis for Polyaromatic Hydrocarbons (PAHs) via Modified NIOSH Method 5515. The method involves solvent desorption using Methylene Chloride, followed by separation and analysis using GC/MS. See the data sheets for the reporting limits for each compound.

Requirement	NIOSH 5515	ATL Modifications
Target compounds	List includes Benzo(e)pyrene.	Standard list does not include Benzo(e)pyrene
Determination of Optimal Solvent	Test is performed on sample filters to determine optimal solvent: Acetonitrile, Benzene, Cyclohexane, or Methylene Chloride.	Methylene Chloride is used as the extraction solvent for all samples.
Standard preparation	Standards are prepared in Toluene using neat compounds.	Commercially available standard mixes in methylene chloride are used.
Calibration range	Suggested range of 0.005 to 5 ug/mL.	Range is approximately 1 0 to 160 ug/mL.
Recovery study for filter	For each filter lot, spike 4 filters at each of the 5 calibration levels. Extract, analyze, and calculate recovery.	Not performed unless requested.
Laboratory Control Spikes	With each analytical batch, spike and extract duplicate filters and tubes If recovery varies by more than +/-5% from the recovery and desorption efficiency study results, than repeat the studies.	Spike filter and tube with each batch Acceptance criterion is 50%-150%.
Lab Blank	Analyze at least three field blanks for each sample medium. Average blank level is subtracted from the sample results.	One lab blank is analyzed per batch; no blank subtraction is performed.
Concentration calculations	Results are corrected for %Recovery and desorption efficiency.	No correction of results performed. A copy of the desorption study is available upon request.
Units	The air concentration in mg/m3 is reported.	Standard reporting unit is mass concentration (ug)
Detector	Flame Ionization Detector (FID)	Mass Spectrometer (MS)

Receiving Notes

A Temperature Blank was included with the shipment. Temperature was measured and was not within 4 +/-2 degrees C. Coolant in the form of blue ice was present. The client was notified via the login fax/email and the analysis proceeded.

Analytical Notes

The front tubes, back tubes and filters were extracted and analyzed separately to monitor for possible breakthrough. Analytical results from only the front tubes were reported since no breakthrough was observed. The reported surrogate recoveries are derived from the front portions of each tube analysis only.

Sample results are not corrected for the desorption efficiency.

Definition of Data Qualifying Flags

Six qualifiers may have been used on the data analysis sheets and indicate as follows:

- B Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

SAMPLE NAME: 5515-1

ID#: 0309224-01AB

MODIFIED NIOSH METHOD 5515 GC/MS

		SIE NATE SONINE SISSE	
		Kreakion -4/28/09 2000	
	Rpt. Limit	Amount	
Compound	(ug)	(ug)	
Naphthalene	2.0	- Not Detected	
2-Methylnaphthalene	2.0	Not Detected	
2-Chloronaphthalene	2.0	Not Detected	
Acenaphthene	2.0	Not Detected	
Acenaphthylene	2.0	Not Detected	
Fluorene	2.0	Not Detected	
Phenanthrene	2.0	Not Detected	
Anthracene	2.0	Not Detected	
Fluoranthene	2.0	Not Detected	
Pyrene	2.0	Not Detected	
Chrysene	2.0	Not Detected	
Benzo(a)anthracene	2.0	Not Detected	
Benzo(b)fluoranthene	2.0	Not Detected	
Benzo(k)fluoranthene	2.0	Not Detected	
Benzo(a)pyrene	2.0	Not Detected	
Indeno(1,2,3-c,d)pyrene	2.0	Not Detected	
Dibenz(a,h)anthracene	2.0	Not Detected	
Benzo(g,h,i)perylene	2.0	Not Detected	
Container Type: NIOSH Tubes XAD-2 w/Filter			
		Method	
Surrogates	%Recovery	Limits	
2-Fluorobiphenyl	88	50-15 0	
Terphenyl-d14	93	50-150	

SAMPLE NAME: 5515-2

ID#: 0309224-02AB

MODIFIED NIOSH METHOD 5515 GC/MS

I former to the second of the		
		AVŠE BIZIK TOLTU
		one by Profes
	Rot. Limit	Amount
Compound	(ug)	(ug)
Naphthalene	2.0	Not Detected
2-Methylnaphthalene	2.0	Not Detected
2-Chloronaphthalene	2.0	Not Detected
Acenaphthene	2.0	Not Detected
Acenaphthylene	2.0	Not Detected
Fluorene	2.0	Not Detected
Phenanthrene	2.0	Not Detected
Anthracene	2.0	Not Detected
Fluoranthene	2.0	Not Detected
Pyrene	2.0	Not Detected
Chrysene	2.0	Not Detected
Benzo(a)anthracene	2.0	Not Detected
Benzo(b)fluoranthene	2.0	Not Detected
Benzo(k)fluoranthene	2.0	Not Detected
Benzo(a)pyrene	2.0	Not Detected
Indeno(1,2,3-c,d)pyrene	2.0	Not Detected
Dibenz(a,h)anthracene	2.0	Not Detected
Benzo(g,h,i)perylene	2.0	Not Detected
Container Type: NIOSH Tubes XAD-2 w/Filb	er	
		Method
Surrogates	%Recovery	Limits
2-Fluorobiphenyl	98	50-150
Terphenyl-d14	101	50-150

SAMPLE NAME: 5515-FB

ID#: 0309224-03AB

MODIFIED NIOSH METHOD 5515 GC/MS

	in the second second second second second second second second second second second second second second second	Harastakans keeda	
	Rpt. Limit	Amount	
Compound	(ug)	(ug)	
Naphthalene	2.0	Not Detected	
2-Methylnaphthalene	2.0	Not Detected	
2-Chloronaphthalene	2.0	Not Detected	
Acenaphthene	2.0	Not Detected	
Acenaphthylene	2.0	Not Detected	
Fluorene	20	Not Detected	
Phenanthrene	2.0	Not Detected	
Anthracene	2.0	Not Detected	
Fluoranthene	2.0	Not Detected	
Pyrene	2.0	Not Detected	
Chrysene	2.0	Not Detected	
Benzo(a)anthracene	2.0	Not Detected	
Benzo(b)fluoranthene	2.0	Not Detected	
Benzo(k)fluoranthene	2.0	Not Detected	
Benzo(a)pyrene	2.0	Not Detected	
Indeno(1,2,3-c,d)pyrene	2.0	Not Detected	
Dibenz(a,h)anthracene	2.0	Not Detected	
Benzo(g,h,i)perylene	2.0	Not Detected	
Container Type: NIOSH Tubes XAD-2 w/Filter	r		
		Method	
Surrogates	%Recovery	Limits	
2-Fluorobiphenyl	101	50-150	
Terphenyl-d14	102	50-150	

SAMPLE NAME: 5515-RB

ID#: 0309224-04AB

MODIFIED NIOSH METHOD 5515 GC/MS

	Epare of Collection \$10/03		
		yaardan bilaas ii ja	
	Rpt. Limit	Amount	
Compound	(ug)	(ug)	
Naphthalene	2.0	Not Detected	
2-Methylnaphthalene	2.0	Not Detected	
2-Chloronaphthalene	2.0	Not Detected	
Acenaphthene	2.0	Not Detected	
Acenaphthylene	2.0	Not Detected	
Fluorene	2.0	Not Detected	
Phenanthrene	2.0	Not Detected	
Anthracene	2.0	Not Detected	
Fluoranthene	2.0	Not Detected	
Pyrene	2.0	Not Detected	
Chrysene	2.0	Not Detected	
Benzo(a)anthracene	2.0	Not Detected	
Benzo(b)fluoranthene	2.0	Not Detected	
Benzo(k)fluoranthene	2.0	Not Detected	
Benzo(a)pyrene	2.0	Not Detected	
Indeno(1,2,3-c,d)pyrene	2.0	Not Detected	
Dibenz(a,h)anthracene	2.0	Not Detected	
Benzo(g,h,i)perylene	2.0	Not Detected	
Container Type: NIOSH Tubes XAD-2 w/Filter			
		Method	
Surrogates	%Recovery	Limits	
2-Fluorobiphenyl	94	50-150	
Terphenyl-d14	96	50-150	

SAMPLE NAME: Lab Blank

ID#: 0309224-05A

MODIFIED NIOSH METHOD 5515 GC/MS

进入1000年,1980年,1980年		alestor NA
		and the substitute of the second
		audion 9/240/
	Rpt. Limit	Amount
Compound	(ug)	(ug)
Naphthalene	2.0	Not Detected
2-Methylnaphthalene	2.0	Not Detected
2-Chloronaphthalene	2.0	Not Detected
Acenaphthene	2.0	Not Detected
Acenaphthylene	2.0	Not Detected
Fluorene	2.0	Not Detected
Phenanthrene	2.0	Not Detected
Anthracene	2.0	Not Detected
Fluoranthene	2.0	Not Detected
Pyrene	2.0	Not Detected
Chrysene	2.0	Not Detected
Benzo(a)anthracene	2.0	Not Detected
Benzo(b)fluoranthene	2.0	Not Detected
Benzo(k)fluoranthene	2.0	Not Detected
Benzo(a)pyrene	2.0	Not Detected
ndeno(1,2,3-c,d)pyrene	2.0	Not Detected
Dibenz(a,h)anthracene	2.0	Not Detected
Benzo(g,h,i)perylene	2.0	Not Detected
Container Type: NA - Not Applicable		
		Method
Surrogates	%Recovery	Limits
2-Fluorobiphenyl	90	50-150
Terphenyl-d14	101	50-150

SAMPLE NAME: LCS

ID#: 0309224-06A

MODIFIED NIOSH METHOD 5515 GC/MS

STREAM CONTROL OF THE STREET O	The same of the sa
The second second second second second second second second second second second second second second second se	

Compound	%Recovery
Naphthalene	92
2-Methylnaphthalene	Not Spiked
2-Chloronaphthalene	Not Spiked
Acenaphthene	89
Acenaphthylene	89
Fluorene	91
Phenanthrene	97
Anthracene	89
Fluoranthene	94
Pyrene	86
Chrysene	90
Benzo(a)anthracene	83
Benzo(b)fluoranthene	83
Benzo(k)fluoranthene	89
Benzo(a)pyrene	84
Indeno(1,2,3-c,d)pyrene	76
Dibenz(a,h)anthracene	82
Benzo(g,h,i)perylene	87

Container Type: NA - Not Applicable

		Method	
Surrogates	%Recovery	Limits	
2-Fluorobiphenyl	94	50-150	
Terphenyl-d14	97	50-150	

 $\mathbf{E}_{\mathbf{O}}$

Environmental Quality Management, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

0309224:

Reference Document No. A 3108 Page 1 of 1

7		Lab Tab	Lab Purc	Ö
16 Generals Tasting	Set AFB	720174 0006 002	Ton Gersta	Ron Kolde
Ĩ	Project Name	Project Number 020174	Project Manager	ample Team Leader

Œ			
Air Toxics	D. de Det 916-985-1000	6 {(g,g	
Lab Destination	Lab Contact/Phone D	5 Purchase Order No.	Carrier/Waybill No.

Cossille EO.	Grille Blud	nuisnati 014 45240	229- 9475	A. W.E.	
eport to: 7,0 kg.	C8%/	7	S. S. S.	Bill to:	

ONE CONTAINER PER LINE

Sample Number	Sample DescriptionType	Date/Time Callected	Container Type	Sample Volume	Pre- servative	Requested Analytical Method/(Parameters)	Requested Analytical Method/(Parameters)	Condition on Receipt (Lab)
Old 5515-1	Filter 2-XAD tolar	9/8-9/14/03	len	A/N	20	Most P	Method	
2-5155 存化	*	9/10/03		···	Į	5515 fer 79.4%	FAH!	
334 SS1S-FB	11	4/10/03						
744 5515-RB	*	9/10/63	1	•	À			
Special instructi	Spacial Instructions: Augran tole	A in Jahale . Frant section,	separate to	in Jahal Supante from whee Blakes annegan in whell the It section, tube to we book section	Blakso a chiou	* 4 - 50	4.2.) &	
Possible Hazard Identification: Non-hazard P Flammable [3 Skin Irritan	S S S		Sample Disposal: Return to Client		Disposal by Lab 🖾	Archive C	(mos.)
Turnaround Time Required:	Turnaround Time Required: Normal 图 Rush		CA Requirements	Requirements:	142	5/5		
1. Relinquished	1. Relinquished by Row Solds.	Date: 4/	1/11/03	1. Received by Standard			Date: Time:	
2. Refinquished by	l by	Date: Time:		2. Received by (Signature Militarion)	Laura	aus L. Homes	Date: Time:	91,2403
Comments:	CUSTODY SEAL INTACTS Y N MONE TEMP (4.40	<u>ن</u> رد ع						:



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This electronic report includes the following:

- Work order Summary;
- Laboratory Narrative;
- · Results; and
- · Chain of Custody (copy).

AN ENVIRONMENTAL ANALYTICAL LABORATORY

WORK ORDER #: 0309221

Work Order Summary

CLIENT:

Mr. Tom Gerstle

BILL TO:

Mr. Tom Gerstle

Environmental Quality Management, Inc

1800 Carillon Boulevard

1800 Carillon Boulevard

Environmental Quality Management,

Cincinnati, OH 45240

Cincinnati, OH 45240

800-229-7495 x 251

P.O. # 6169

030174,0006.002 Scott AFB

FAX:

12A

PHONE:

513-825-7495

PROJECT # CONTACT:

TEST

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

Modified Method 0011

DeDe Dodge

DATE RECEIVED: DATE COMPLETED: 9/12/03 9/25/03

FRACTION# NAME 01A 0011-1 02A 0011-2 03A 0011-FB 04A 0011-RB 05A MeCl2 Blank 06A Type 1 H2O Blank 07A Trip Blank 9/4/03 08A Trip Spike 9/4/03 09A Trip Blank 9/9/03 10A Trip Spike 9/9/03 Lab Blank 11A

LCS

CERTIFIED BY-

Sinda d. Fruman

09/25/03

Laboratory Director

Certfication numbers: AR DEQ, CA NELAP - 02110CA, LA NELAP/LELAP - AJ 30763, NJ NELAP - CA004 NY NELAP - 11291, UT NELAP - 9166389892

Name of Accrediting Agency NELAP/Florida Department of Health, Scope of Application: Clean Air Act, Accreditation number: E87680, Effective date: 07/01/03, Expiration date: 06/30/04

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

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180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630 (916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE

Modified Method 0011

Environmental Quality Management, Inc. Workorder# 0309221

Six Jar and four DNPH Screw Cap Vial samples were received on September 12, 2003. The laboratory performed the analysis via Modified EPA SW-846 Method 0011/8315 using High Pressure Liquid Chromatography (HPLC) with an Ultraviolet (UV) Detector. See the data sheets for the reporting limits for each compound.

Requirement	Method 0011/8315A	ATL Modifications
Reagent Cleaning	Cleaning utilizes DCM with a final cleaning using cyclohexane.	70:30 Hexane: DCM used for all cleanings.
Extraction	Serially extracted two to three times with DCM Concentrate using Kuderna-Danish (K-D).	Extracted one time with 70:30 Hexane: DCM (a DCM only extraction solvent may be used if client requests). Concentrate using Nitrogen evaporator (turbo-vap). Single extraction is sufficient and minimizes further addition of background contamination.
Extraction Conditions	Use buffer to adjust pH of sample prior to extraction.	Adjustment of pH not performed.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

The trip blanks, 9/4/03 and 9/9/03, have reportable levels of formaldehyde present.

Samples 0011-1 and 0011-2 appeared colorless which indicated that the reagent derivitization capacity may have been exceeded. To insure complete derivatization of carbonyls in the samples, an aliquot of 2,4-DNPH was added to the samples prior to extraction.

Extraction solvent was not added to samples 0011-RB, Trip Spike 9/4/03, and Trip Spike 9/9/03 at the time of collection which may have caused a breakdown of Acrolein in the acidic DNPH reagent.

The extraction solvent was added to sample 0011-FB in the field, therefore the date of extraction is also the date of collection.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

- B- Compound present in laboratory blank greater than reporting limit.
- J Estimated value.
- E Exceeds instrument calibration range.
- S Saturated peak.
- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue

SAMPLE NAME: 0011-1

ID#: 0309221-01A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Elio Range (a) Collegion (9803) Collegion (9803) Sulfacing (880) Collegion (9803) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Collegion (980) Sulfacing (880) Collegion (980) Su

	Rpt. Limit	Amount
Compound	(ug)	(ug)
Formaldehyde	26	800
Acetaldehyde	26	750
Acrolein	26	Not Detected
Propanal	26	Not Detected
Crotonaldehyde	26	90 M
Methyl Ethyl Ketone/Butyraldehydes	26	Not Detected
Benzaldehyde	26	Not Detected
Isopentanal	26	Not Detected
Pentanal	26	Not Detected
o-Tolualdehyde	26	Not Detected
m,p-Tolualdehyde	26	Not Detected
Hexanal	26	Not Detected

M = Reported value may be biased due to apparent matrix interferences Total Volume = 570 mL

Container Type: Jar

SAMPLE NAME: 0011-2

ID#: 0309221-02A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

110

110

Not Detected

Not Detected

Compound	Rpt Limit (ug)	obaccan 9/15/03 Amount (ug)
Formaldehyde	110	3800
Acetaldehyde	110	1200
Acrolein	110	560
Propanal	110	240
Crotonaldehyde	110	260
Methyl Ethyl Ketone/Butyraldehydes	110	260
Benzaldehyde	110	220 M
sopentana!	110	Not Detected
Pentanal	110	Not Detected
o-Tolualdehyde	110	Not Detected

M = Reported value may be biased due to apparent matrix interferences Total Volume = 630 mL

Container Type: Jar

m,p-Tolualdehyde

Hexanal

SAMPLE NAME: 0011-FB

ID#: 0309221-03A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Chiante Control of Con	2:01 /PM
Rnt Limit A	mount

	Rpt. Limit	Amount
Compound	(ug)	(ug)
Formaldehyde	2.5	22
Acetaidehyde	2.5	18
Acrolein	2.5	Not Detected
Propanal	2.5	13
Crotonaldehyde	2.5	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	2.5	Not Detected
Benzaldehyde	2.5	Not Detected
Isopentanal	2.5	17
Pentanal	2.5	Not Detected
o-Tolualdehyde	2.5	Not Detected
m,p-Tolualdehyde	2.5	Not Detected
Hexanal	2.5	13

Total Volume = 480 mL Container Type: Jar

SAMPLE NAME: 0011-RB

ID#: 0309221-04A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

		rgaeron (1100) vontesis (4050) or 40 PM atraction (4050)
Compound	Rpt. Limit (ug)	Amount (ug)
Formaldehyde	2.9	17
Acetaldehyde	2.9	3.5
Acrolein	2.9	Not Detected
Propanal	2.9	47
Crotonaldehyde	2.9	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	29	Not Detected
Benzaldehyde	2.9	Not Detected
Isopentanal	2.9	6.4
Pentanal	2.9	Not Detected
o-Tolualdehyde	2.9	Not Detected
ო,p-Tolualdehyde	2.9	Not Detected
Hexanal	2.9	76

Total Volume = 520 mL Container Type: Jar

SAMPLE NAME: MeC12 Blank

ID#: 0309221-05A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Ellewansu. Control of the Control of	17 PW
Pot Limit Am	ount

	Rpt. Limit	Amount
Compound	(uġ)	(ug)
Formaldehyde	1.9	Not Detected
Acetaldehyde	1.9	10
Acrolein	1.9	Not Detected
Propanal	1.9	Not Detected
Crotonaldehyde	1.9	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	1.9	Not Detected
Benzaldehyde	19	Not Detected
Isopentanal	1.9	Not Detected
Pentanal	1.9	Not Detected
o-Tolualdehyde	1.9	Not Detected
m,p-Tolualdehyde	1.9	Not Detected
Hexanal	1.9	Not Detected

Total Volume = 100 mL Container Type: Jar

SAMPLE NAME: Type 1 H2O Blank

ID#: 0309221-06A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Compound	Rpt. Limit (ug)	Amount (ug)
Formaldehyde	0 50	Not Detected
Acetaldehyde	0 50	0.55
Acrolein	0.50	Not Detected
Propanal	0.50	Not Detected
Crotonaldehyde	0.50	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	0 50	Not Detected
Benzaldehyde	0 50	Not Detected
sopentanal	0.50	Not Detected
Pentanal	0.50	Not Detected
o-Tolualdehyde	0.50	Not Detected
m,p-Tolualdehyde	0.50	Not Detected
Hexanal	0 50	Not Detected

Total Volume = 215 mL Container Type: Jar

SAMPLE NAME: Trip Blank 9/4/03

ID#: 0309221-07A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

	Laur of Abdrysis (1/5/07-10-A1AN)	
Compound	Rpt. Limit (ug)	Amount (ug)
Formaldehyde	0 50	0.69
Acetaidehyde	0 50	Not Detected
Acrolein	0.50	Not Detected
Propanal	0.50	Not Detected
Crotonaldehyde	0.50	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	0.50	Not Detected
Benzaldehyde	0 50	Not Detected
sopentanal	0.50	Not Detected
Pentanal	0 50	Not Detected
o-Tolualdehyde	0.50	Not Detected
m,p-Tolualdehyde	0 50	Not Detected

0 50

Not Detected

Total Volume = 10.0 mL

Hexanal

SAMPLE NAME: Trip Spike 9/4/03

ID#: 0309221-08A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC



Compound	%Recovery
Formaldehyde	97
Acetaldehyde	102
Acrolein	70Q
Propanal	121
Crotonaldehyde	Not Spiked
Methyl Ethyl Ketone/Butyraldehydes	109
Benzaldehyde	Not Spiked
Isopentanal	Not Spiked
Pentanal	111
o-Tolualdehyde	Not Spiked
m,p-Tolualdehyde	Not Spiked
Hexanal	90

Q = Exceeds Quality Control limits Total Volume = 11.0 mL

SAMPLE NAME: Trip Blank 9/9/03

ID#: 0309221-09A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

FURLER OF THE PROPERTY OF THE	na 1/15/03 (11:12 am 1/15/03
Rpt. Limît	Amount

	Rpt. Limit	Amount
Compound	(ug)	(ug)
Formaldehyde	0.50	0.58
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	 Not Detected
Propanal	0 50	Not Detected
Crotonaldehyde	0.50	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	0 50	Not Detected
Benzaldehyde	0.50	Not Detected
Isopentanal	0 50	Not Detected
Pentanal	0.50	Not Detected
o-Tolualdehyde	0.50	Not Detected
m,p-Tolualdehyde	0.50	Not Detected
Hexanal	0.50	Not Detected

Total Volume = 10.0 mL

SAMPLE NAME: Trip Spike 9/9/03

ID#: 0309221-10A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Control of the Contro	-
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Compound	%Recovery
Formaldehyde	101
Acetaldehyde	99
Acrolein	<0.50 Q
Propanal	124
Crotonaldehyde	Not Spiked
Methyl Ethyl Ketone/Butyraldehydes	107
Benzaldehyde	Not Spiked
Isopentanal	Not Spiked
Pentanal	107
o-Tolualdehyde	Not Spiked
m,p-Tolualdehyde	Not Spiked
Hexanal	88

Q = Exceeds Quality Control limits Total Volume = 11 0 mL

SAMPLE NAME: Lab Blank

ID#: 0309221-11A

MODIFIED EPA SW-846 METHOD 0011/8315A HPLC

Elik (Amik)		dlection: NA natysis 9(45/03:07:22 AM
		coraction 19/45/03
Compound	Rpt. Limit (ug)	Amount (ug)
Formaldehyde	0.50	Not Detected
Acetaldehyde	0.50	Not Detected
Acrolein	0.50	Not Detected
Propanal	0 50	Not Detected
Crotonaldehyde	0.50	Not Detected
Methyl Ethyl Ketone/Butyraldehydes	0 50	Not Detected
Benzaldehyde	0.50	Not Detected
sopentanal	0 50	Not Detected
Pentanal	0 50	Not Detected
o-Tolualdehyde	0.50	Not Detected
m,p-Tolualdehyde	0.50	Not Detected
Hexanal	0.50	Not Detected

Total Volume = 100 mL

Container Type: NA - Not Applicable

TELEPHONE 773-772-3577 FAX NO 773-772-3778

Phoenix Chemical Laboratory, Inc.

FUEL AND LUBRICANT TECHNOLOGISTS 3953 SHAKESPEARE AVENUE CHICAGO, ILL. 60647-3497

September 29, 2003

RECEIVED FROM

Environmental Quality Management, Inc.

1800 Carillon Blvd. Cincinnati, OH 45240

SAMPLE OF

Attn: Tina Dunmoyer Biodiesel

LABORATORY NO

03 9 16 25

MARKED

030174,0006,002

09/10/03

Sulfur, %	0.026
Carbon, %	84.89
Hydrogen, %	12.96
Nitrogen, ppm	51
Ash, %	0.002
Oxygen, % by difference	2.12
Heat of Combustion, BTU/Lb	
Gross	19035
Net	17853
Hydrocarbon Types, %	
Oxygenates, as methylsoyate	18.6
Saturated Hydrocarbons	
Paraffins	26.6
Naphthenes	17.7
Olefins (Note 1)	trace
Aromatics	37.1

Note 1: Olefinic hydrocarbons not including unsaturation associated with methylsoyate.

Mun Al Juwely
Arthur A. Krawetz



H O

Environmental Quality Management, Inc.

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD

Reference Document No. A- 3110 Page 1 of _____

EXIDERESMENTAL Lab Destination PHOENIX CHEMICAL Report to: 10M SERSTEE 13-772-357 Carrier/Waybill No. 340 Lab Contact/Phone Project Manager TUM 6ERSTE Lab Purchase Order No. Project Name - 86 (25.15/2 ATOR 75571) Project Number 0.30/74, 0000-002 Sample Team Leader Tom GERSTEE

BIII 10: SFECE SCHUICK MAN BIII 10: SFECE SCHUICK MAN BOO CAR (CLONBLOD)

ONE CONTAINER PER LINE

Sample Number	Sample Description/Type	Date/Time Collected	Container Type	Sample Volume	Pre- servative	Requested Analytical Method/(Parameters)	Condition on Receipt (Lab)
133800	RIDA 18851 AUDIESEL	50/01/80	10/03 500 ml	1000 ml	d	PONA (ARAFFUS	
			CLASS		O	OLEFINS NAPHTHERES	
					A	AROMATICS) % CARROL	7
						PSUCFUR 90 HYDROCEN	CEN
					6	PANTROCES. PARH	
Special Instructi	Special Instructions: SAMPLE HAS BEEN Special Instructions: SAMPLE HAS BEEN		LIT FOR	SUIT FOR SHIVEING	В	Btu / lb	
Possible Hazard Identification:	る Possible Hazard Identification: Non-hazard 口 Flammable 図 Skin Irritant 図 Ott	other		Sample Disposal: Return to Client		Disposal by Lab 🔲 Archive	(тоs:)
Turnaround Time Required:	Turnaround Time Required: Normal Y Rush Results Required by		QA Requirements:	nents:			
1. Relinquished by (Signature/Affiliation)	16 Mis	Date: 09/15	1. (600	1. Received by (Signature/Affiliation)	÷	Date: Time:	
2. Relinquished by (Signature/Affiliation)		Date: Time:		2. Received by (Signature/Affiliation)		Date: Time:	
Comments:		· · · · · · · · · · · · · · · · · · ·	-	:			

APPENDIX D QUALITY ASSURANCE/QUALITY CONTROL

HORSE POWER CALCULATIONS	
•	

-86 Horsepower Calculation

Example Calculation: Scott AFB, 10% load [208 volts x 25 amps x 3^0 5 x 0 9/1000] kw x 1 341 kw/hp = 10 87 hp

Unit/Load	Run No.	Fuel Usage lbs/hr	AMPS	kilowatts	Calculated horsepower
DG09					
10%	1	26 00	25	8 11	10 87
	2	26.80	25	8.11	10.87
	3	28 29	2 5	8 11	10.87
Average		27 03	25		10 87
25%	1	32 02	100	32.42	43.48
	2	32.40	100	32.42	43.48
	3	32 54	100	32.42	43.48
Average		32 32	100		43 48
50%	1	37 83	130	42 15	56.52
5570		37.30	130	42.15	56.52
	2 3	36 61	130	42 15	56.52
Average	Ū	37.25	130	42.15	56.52
75%	1	46 96	190	61.61	82.61
	2 3	47 64	190	61.61	82.61
	3	47.23	190	61.61	82.61
Average		47 28	190	61 61	82,61
100%	1	44 05	210	68 09	91 31
,00,0	2	41.08	210	68.09	91.31
	3	43 03	210	68 09	91 31
Average	Ü	42 72	210	68.09	91.31
FL08					
100%	1	2.03	20	6.48	8.70
100 /6		2.03	20	6 48	8.70 8.70
	2 3	2 03	20	6.48	8.70 8.70
Assamana	3				
Average		2.03	20	6 48	8 70

CEM – GASEOUS POLLUTANTS (CO, CO₂, O₂, THC, NO_X) – -86 Generator

Date:	Run:	10-1			Ho	rsepower:	10.9	
9/8/2003	Flow (dscfm):	359			Fuel Usag	je (gal/hr):	3.5	
Í	Moisture (%):	3.7						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
Í	Concentration (ppm or %)	1337 00	36 80	59 24	63.14	3 90	42	16.2
	Mass Rate (lb/hr)	3.44	0.06	0 05	5 61E-02	3 49E-03		
	Mass Rate (lb/gal fuel)	0.98	0 02	0 02	0.02	0.00	·	
	Mass Rate (gr/hp*hr)	143.63	2.41	2.20	2.34	0.15		

Date:	Run:	10-2		•	Но	rsepower:	10.9	
9/8/2003	Flow (dscfm):	353			Fuel Usag	je (gal/hr):	36	
	Moisture (%):	4						
}	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	Q2
	Concentration (ppm or %)	1315.00	36.40	42.55	46 15	3 60	4.2	16 1
ŀ	Mass Rate (lb/hr)	3 33	0.06	0 04	4.03E-02	3 17E-03		
1	Mass Rate (lb/gal fuel)	0.92	0.02	0.01	0 01	0 00		
	Mass Rate (gr/hp*hr)	138.91	2.34	1.55	1.68	0.13	_	

Date:	Run:	10-3			Но	rsepower:	10.9	
9/8/2003	Flow (dscfm):	352			Fuel Usag	ge (gal/hr):	38	
	Moisture (%):	3.8			_	,		
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	1300.00	36.10	41 09	44.59	3.50	41	16 1
	Mass Rate (lb/hr)	3.28	0.06	0.04	3 89E-02	3 07E-03		
	Mass Rate (lb/gal fuel)	0 86	0 01	0 01	0.01	0.00		
	Mass Rate (gr/hp*hr)	136.93	2.31	1.49	1.62	0.13		

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Date:	Run:	25-1			Но	rsepower:	43 5	
9/9/2003	Flow (dscfm):	352			Fuel Usag	ge (gal/hr):	43	
	Moisture (%):	4.6			•			
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	Q2
ļ	Concentration (ppm or %)	1411.00	37 70	47 19	49 69	3.20	4.3	15 9
	Mass Rate (lb/hr)	3 56	0.06	0 04	4 33E-02	2.81E-03	_	
	Mass Rate (lb/gal fuel)	0.82	0 01	0 01	0.01	0 00		
	Mass Rate (gr/hp*hr)	37.16	0.60	0.42	0.45	0.03		

Date:	Run:	25-2			Но	rsepower:	43 5	
9/9/2003	Flow (dscfm):	354			Fuel Usag	je (gal/hr):	44	
	Moisture (%):	4.7						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
ĺ	Concentration (ppm or %)	1494 00	39 00	43.62	45 10	3.00	4.4	15.6
	Mass Rate (lb/hr)	3.79	0 06	0 04	3.95E-02	2 65E-03		
	Mass Rate (lb/gal fuel)	0 87	0.01	0.01	0 01	0 00		
	Mass Rate (gr/hp*hr)	39.57	0.63	0.39	0.41	0.03		

Date:	Run:	25-3			Но	rsepower:	43.5	
9/9/2003	Flow (dscfm):	353			Fuel Usag	ge (gal/hr):	44	
1	Moisture (%):	5.2						
	Pollutant:	NOx	CO	NMHC	THC	Methane	ÇO2	Q2
	Concentration (ppm or %)	195.30	98 30	41.28	79.10	1 10	4.1	15 2
	Mass Rate (lb/hr)	0 49	0 15	0.07	6 91E-02	9 67E-04		
	Mass Rate (lb/gal fuel)	0.11	0.03	0 02	0.02	0 00		
	Mass Rate (gr/hp*hr)	5.16	1.58	0.71	0.72	0.01		

Date:	Run:	50-1			Ho	rsepower:	56 5	
9/9/2003	Flow (dscfm):	351			Fuel Usag	ge (gal/hr):	5.1	
	Moisture (%):	5.1			_			
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	02
	Concentration (ppm or %)	1730 00	43.40	51.60	52 00	0.40	49	14 7
	Mass Rate (lb/hr)	4 35	0 07	0 04	4.52E-02	3.50E-04	-	
	Mass Rate (lb/gal fuel)	0.85	0.01	0.01	0 01	0 00		
	Mass Rate (gr/hp*hr)	34.94	0.53	0.36	0.36	0.00		

Date:	Run:	50-2			Ho	rsepower:	56 5	
9/9/2003	Flow (dscfm):	354			Fuel Usag	ge (gal/hr):	5.0	
	Moisture (%):	4.3						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	02
	Concentration (ppm or %)	1752 00	43.00	48.29	48.69	0 40	49	14 6
	Mass Rate (lb/hr)	4 44	0.07	0.04	4 27E-02	3 53E-04		
	Mass Rate (lb/gal fuel)	0 88	0 01	0 01	0.01	0.00		
	Mass Rate (gr/hp*hr)	35.69	0.53	0.34	0.34	0.00		

Date:	Run:	50-3			Но	rsepower:	56 5	
9/9/2003	Flow (dscfm):	352			Fuel Usag	ge (gal/hr):	4.9	
	Moisture (%):	4.7			-			
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	02
	Concentration (ppm or %)	1741 00	42.40	43.87	44 07	0.20	48	147
	Mass Rate (lb/hr)	4 39	0 07	0 04	3 84E-02	1 75E-04		-
	Mass Rate (lb/gal fuel)	0.89	0.01	0.01	0.01	0 00		
	Mass Rate (gr/hp*hr)	35.27	0.52	0.31	0.31	0.00		

Date:	Run:	75-1			Ho	rsepower:	82 6	
9/9/2003	Flow (dscfm):	347			Fuel Usag	je (gal/hr):	6.3	1
	Moisture (%):	6.4			-			
	Poliutant:	NOx	CO	NMHC	THC	Methane	CO2	Q 2
	Concentration (ppm or %)	2310.00	81.10	42.05	55.02	0 10	62	12.8
	Mass Rate (lb/hr)	5 74	0.12	0.05	4 73E-02	8 65E-05	**	
	Mass Rate (lb/gal fuel)	0.91	0.02	0 01	0.01	0 00		
	Mass Rate (gr/hp*hr)	31.56	0.67	0.26	0.26	0.00		

Date:	Run:	75-2			Но	rsepower:	82.6	
9/9/2003	Flow (dscfm):	343			Fuel Usag	je (gal/hr):	64	
	Moisture (%):	6.5						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	2308 00	76 20	38.39	40.00	0 00	6.2	128
	Mass Rate (lb/hr)	5 67	0.11	0 03	3 40E-02	0.00E+00		
	Mass Rate (lb/gal fuel)	0 88	0 02	0.01	0.01	0 00		
	Mass Rate (gr/hp*hr)	31.17	0.63	0.19	0.19	0.00		

Date:	Run:	75-3			Но	rsepower:	82 6	
9/9/2003	Flow (dscfm):	343			Fuel Usag	je (gal/hr):	6.4	
İ	Moisture (%):	6.3				, , ,		
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	2224 00	73.10	37.53	40 77	0.00	6 1	12.9
	Mass Rate (lb/hr)	5.47	0.11	0.03	3.46E-02	0 00E+00		
	Mass Rate (lb/gal fuel)	0.86	0.02	0 01	0.01	0 00		
	Mass Rate (gr/hp*hr)	30.04	0.60	0.19	0.19	0.00		

Date:	Run:	100-1			Ho	rsepower:	91.3	
9/10/2003	Flow (dscfm):	349			Fuel Usag	je (gal/hr):	5.9	
	Moisture (%):	5.6						
l	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	2041 00	42 90	38 67	38.67	0.00	5.4	13 7
	Mass Rate (lb/hr)	5 10	0.07	0 03	3 34E-02	0 00E+00	-	
	Mass Rate (lb/gal fuel)	0 86	0 01	0 01	0.01	0.00	***	
	Mass Rate (gr/hp*hr)	25.38	0.32	0.17	0.17	0.00	·	

Date:	Run:	100-2			Ho	rsepower:	91 3	
9/10/2003	Flow (dscfm):	342			Fuel Usag	je (gal/hr):	5 5	
	Moisture (%):	5.7						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	2000.00	45.50	43 52	43 52	0 00	5.6	13 3
	Mass Rate (lb/hr)	4 90	0 07	0.04	3.69E-02	0 00E+00		•••
	Mass Rate (lb/gal fuel)	0.88	0 01	0 01	0 01	0 00		~ =
	Mass Rate (gr/hp*hr)	24.37	0.34	0.18	0.18	0.00		

Date:	Run:	100-3			Но	rsepower:	91 3	
9/10/2003	Flow (dscfm):	333			Fuel Usag	ge (gai/hr):	5.8	,
	Moisture (%):	5.8						
	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O 2
	Concentration (ppm or %)	2004 00	45.80	44.90	44.90	0 00	56	13.6
	Mass Rate (lb/hr)	4.78	0.07	0 04	3 70E-02	0 00E+00		
	Mass Rate (lb/gal fuel)	0 82	0 01	0.01	0.01	0.00		
	Mass Rate (gr/hp*hr)	23.77	0.33	0.18	0.18	0.00		

CEM – GASEOUS POLLUTANTS (CO, CO₂, O₂, THC, NO_X) - MF2 Lighting Unit Generator

Date:	Run:	L-5-1			Ho	rsepower:	8.7	
9/10/2003	Flow (dscfm):	30			Fuel Usag	je (gal/hr):	03	٠
f	Moisture (%):	3.4			_			
<u>}</u>	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	277.60	181.40	36 58	36 58	0 00	4 1	14.9
	Mass Rate (lb/hr)	0.06	0.02	0 00	2 72E-03	0.00E+00		-
	Mass Rate (lb/gal fuel)	0 22	0 09	0.01	0.01	0.00		-
L	Mass Rate (gr/hp*hr)	3.12	1.24	0.14	0.14	0.00		

Date:	Run:	L-5-2			Но	rsepower:	8.7	
9/10/2003	Flow (dscfm):	30			Fuel Usag	je (gal/hr):	03	
[Moisture (%):	5.3						
	Poliutant:	NOx	CO	NMHC	THC	Methane	CO2	02
	Concentration (ppm or %)	243 00	180.90	38 01	38.01	0 00	41	15 1
1	Mass Rate (lb/hr)	0 05	0 02	0.00	2 82E-03	0 00E+00		
	Mass Rate (lb/gal fuel)	0 19	0.09	0 01	0.01	0 00	-	
	Mass Rate (gr/hp*hr)	2.73	1.24	0.15	0.15	0.00	-	

Date:	Run:	L-5-3			Но	rsepower:	87	
9/10/2003	Flow (dscfm):	30			Fuel Usag	ge (gal/hr):	0.3	
1	Moisture (%):	5			_			
}	Pollutant:	NOx	CO	NMHC	THC	Methane	CO2	O2
	Concentration (ppm or %)	261 10	176.40	36 63	36 63	0.00	43	15 3
	Mass Rate (lb/hr)	0 06	0.02	0.00	2 72E-03	0.00E+00		
	Mass Rate (lb/gal fuel)	0 20	0 08	0 01	0 01	0 00		
	Mass Rate (gr/hp*hr)	2.93	1.20	0.14	0.14	0.00		

PARTICULATE -86 GENERATOR

Summary of Stack Gas Parameters and Test Results **Generator Testing** Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 10% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	10-5-1 9/8/2003 1513-1613	10-5-2 9/8/2003 1637-1737	10-5-3 9/8/2003 1752-1852	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	4 60 🗸	, 3 50	3.50	3 87
y	Meter Box Correction Factor	1 006 🗸	1 006	1 006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 65	30 65	30 65	30 65
V _m	Sample Volume, ft ³	49 829	48 547	43 733	47 370
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 2688	1 3693	1 4101	1.3494
DH	Avg Meter Orifice Pressure, in H ₂ O	2.20	2 13	1 60	1 98
T _m	Average Meter Temperature, °F	88	91	92	90
T _s	Average Stack Temperature, *F	300 🗸	449	510	420
V _{IC}	Condensate Collected, ml	404	42 9	36.7	40 0
CO ₂	Carbon Dioxide content, % by volume	42 /	42	41	4.2
O ₂	Oxygen content, % by volume	162	16 1	16.1	16 1
N ₂	Nitrogen content, % by volume	796	79 7	79.8	797
C _p	Pitot Tube Coefficient	0.99	0.99	0 99	0.99
Op	Circular Stack? 1=Y.0=N	1	1.00	1	0.98
As	Diameter or Dimensions, Inches:	4001	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D _n	Nozzle Diameter, inches	0 195	0 195	0 183	0 191
•	CALCULATED DATA				
A _n	Nozzle Area, ft*	0 000207	0 000207	0.000183	0.000199
$V_{m(std)}$	Standard Meter Volume, ft	49718	48 211	43 297	47 075
$V_{m(std)}$	Standard Meter Volume, m*	1 408	1 365	1 226	1 333
\mathbf{Q}_{m}	Average Sampling Rate, dscfm	0.829	0.804	0.722	0.785
Ps	Stack Pressure, inches Hg	30.99	30 91	30.91	30.93
B _{ws}	Moisture, % by volume	37	40	38	38
B _{ws(sat)}	Moisture (at saturation), % by volume	445.6	2867.2	5139.7	2817.5
-V _{wstd}	Standard Water Vapor Volume, ft*	1 902	2 019	1 727	1 883
1-B _{ws}	Dry Mole Fraction	0.963	0.960	0.962	0.962
M _d	Molecular Weight (d b), lb/lb•mole	29 32	29 32	29 30	29 31
Ms	Molecular Weight (w.b), lb/lb-mole	28.90	28.86	28 87	28.88
٧s	Stack Gas Velocity, ft/s	989 1	117 0	124 4	113 4
A	Stack Area, ft ²	0.1 518	0.1 613	0.1	0.09
Q _s Q _s	Stack Gas Volumetric flow, acfm Stack Gas Volumetric flow, dscfm	359 1	353	652 352	594 355
Q _s	Stack Gas Volumetric flow, dscrim	10	303 10	352 10	10
us I	Isokinetic Sampling Ratio, %	97.2	95.9	97.9	97.0



Summary of Stack Gas Parameters and Test Results Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 10% Loading

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	RUN NUMBER RUN DATE RUN TIME	10-5-1 9/8/2003 1513-1613	10-5-2 9/8/2003 1637-1737	10-5-3 9/8/2003 1752-1852	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	12.2	5.9	8.45	
PM	Beaker Weight Gain, mg	11.65	11.75	13.8	
PM	Total Catch, g	0.0239	0.0177	0.0223	0.0213
CPM	Concentration, gr/dscf	7.40E-03	5.65E-03	7.93E-03	6.99E-0
CPM	Concentration, lb/dscf	1.06E-06	8.07E-07	1.13E-06	9.99E-0
E _{PM}	Emission Rate, lb/hr	2.28E-02	1.71E-02	2.39E-02	2.13E-0
	Condensible Matter				
PM	Organic Gain, mg	12 3	12.2	12 4	
PM	Aqueous Gain, mg	19.3	14	18 9	
PM	Total Catch, g	0.0316	0.0262	0 0313	0.0
Cpts	Concentration, gr/dscf	9.81 E- 03	8.39E-03	1.12E-02	9.78E-0
CPM	Concentration, lb/dscf	1.40E-06	1.20E-06	1.59E-06	1.40E-0
E _{PM}	Emission Rate, lb/hr	3.02E-02	2.53E-02	3.37E-02	2.97E-0
	Total Particulate Matter				
PM	Total Catch, g	5.55 E- 02	4 39E-02	5.36E-02	0.0
C _{PM}	Concentration, gr/dscf	1.72E-02	1.40E-02	1.91E-02	0.0
CPM	Concentration, lb/dscf	2.46E-06	2.01E-06	2.73E-06	0.0
EPM	Emission Rate, lb/hr	5.29E-02	4.24E-02	5.76E-02	0.0

Summary of Stack Gas Parameters and Test Results Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 25% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	25-5-1 9/9/2003 0809-0909	25-5-2 9/9/2003 0925-1025	25-5-3 9/9/2003 1042-1142	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	9.00	2 50	2.50	4.67
у	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P _{bar}	Barometric Pressure, inches Hg	30.69	30.69	30.69	30 69
V _m	Sample Volume, ft ³	45 611	42.175	44.423	44.070
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 4177	1 4403	1 4572	1 4384
DH	Avg Meter Orifice Pressure, in H ₂ O	1 90	1 65	1.70	1.75
T _m	Average Meter Temperature, °F	69	78	88	78
T _s	Average Stack Temperature, °F	523	523	549	532
V _{Ic}	Condensate Collected, ml	48.3	44 8	517	48 3
CO₂	Carbon Dioxide content, % by volume	43	44	4.1	43
02	Oxygen content, % by volume	15 9	15.6	15.2	15.6
N ₂	Nitrogen content, % by volume	79.8	80.0	80 7	80 2
C _p	Pitot Tube Coefficient	0 99	0 99	0 99	0 99
- μ	Circular Stack? 1=Y.0=N	1	1	1	
As	Diameter or Dimensions, inches:	4 00	4 00	4.00	4.00
Q	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0 195	0.183	0 183	0.187
	CALCULATED DATA				
A_n	Nozzle Area, ft*	0 000207	0 000183	0 000183	0 000191
V _{m(std)}	Standard Meter Volume, ft*	47 172	42 863	44 329	44 788
V _{m(std)}	Standard Meter Volume, m"	1 336	1.214	1 255	1 268
Q_m	Average Sampling Rate, dscfm	0 786	0.714	0.739	0 746
Ps	Stack Pressure, inches Hg	31 35	30 87	30.87	31 03
B _{ws}	Moisture, % by volume	46	4.7	52	48
$B_{ws(sat)}$	Moisture (at saturation), % by volume	5680.5	5768.4	7181.8	6210.2
V_{wstd}	Standard Water Vapor Volume, ft	2 273	2.109	2 434	2.272
1-B _{ws}	Dry Mole Fraction	0.954	0.953	0.948	0.952
M _d	Molecular Weight (d b), lb/lb-mole	29 32	29 33	29 26	29 31
Ms	Molecular Weight (w.b.), lb/lb•mole	28.80	28.80	28 68	28.76
٧ _s	Stack Gas Velocity, ft/s	125.2	128.2	131 7	128 3
A	Stack Area, ft ²	0.1	0.1	0.1	0.09
Q,	Stack Gas Volumetric flow, acfm	655	671	689	672
Q,	Stack Gas Volumetric flow, dscfm	352	354	353	353
Q_s	Stack Gas Volumetric flow, dscmm	10	10	10	10
1	Isokinetic Sampling Ratio, %	94.0	96.3	100.1	96.8

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB US EPA Test Method 5 - Particulate Matter Generator - 25% Loading Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	25-5-1 9/9/2003 0809-0909	25-5-2 9/9/2003 0925-1025	25-5-3 9/9/2003 1042-1142	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	12.85	5 85	11.95	
PM	Beaker Weight Gain, mg	23.6	22.85	15.5	
PM	Total Catch, g	0 0365	0.0287	0.0275	0.0309
CPM	Concentration, gr/dscf	1.19E-02	1.03E-02	9.56E-03	1.06E-0
CPM	Concentration, lb/dscf	1.70E-06	1.48E-06	1.37E-06	1.51E-0
EPM	Emission Rate, lb/hr	3.60E-02	3.14E-02	2.89E-02	3.21E-0
	Condensible Matter				
PM	Organic Gain, mg	12 5	107	12	
PM	Aqueous Gain, mg	15.3	12.3	23.7	
PM	Total Catch, g	0.0278	0.0230	0.0357	0.0
CPM	Concentration, gr/dscf	9.09E-03	8.28E-03	1.24E-02	9.93E-(
CPM	Concentration, lb/dscf	1.30E-06	1.18E-06	1.78E-06	1.42E-0
E _{PM}	Emission Rate, lb/hr	2.74E-02	2.52E-02	3.76E-02	3.01E-0
	Total Particulate Matter				
PM	Total Catch, g	6 43E-02	5 17E-02	6.32E-02	0.00
C _{PM}	Concentration, gr/dscf	2.10E-02	1.86E-02	2.20E-02	0.0
CPM	Concentration, lb/dscf	3.00E-06	2.66E-06	3.14E-06	0.0
E _{PM}	Emission Rate, lb/hr	6.34E-02	5.65E-02	6.65E-02	0.0

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 50% Loading

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	RUN NUMBER RUN DATE RUN TIME	50-5-1 9/9/2003 1155-1255	50-5-2 9/9/2003 1310-1410	50-5-3 9/9/2003 1424-1524	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	3 50	3 50	4 00	3 67
у	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P_{bar}	Barometric Pressure, inches Hg	30.69	30 69	30 69	30 69
V_{m}	Sample Volume, ft ³	43 904	8 996	44 623	32 508
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 4830	1 5000	1 5000	1.4943
DH	Avg Meter Orifice Pressure, in H ₂ O	1 66	0 16	1.68	1 17
T _m	Average Meter Temperature, °F	91	89	94	91
T _s	Average Stack Temperature, °F	595	617	620	611
V _{ic}	Condensate Collected, ml	50.1	85	46.4	35 0
CO ₂	Carbon Dioxide content, % by volume	49	49	4.8	49
O ₂	Oxygen content, % by volume	14 7	14 6	14 7	14.7
N ₂	Nitrogen content, % by volume	80 4	80 5	80 5	80 5
C _p	Pitot Tube Coefficient	0.99	0.99	0 99	0 99
-μ	Circular Stack? 1=Y.0=N	1	1	1	• • •
As	Diameter or Dimensions, inches	4 00	4.00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0 183	0 120	0 183	0 162
	CALCULATED DATA				
A_n	Nozzie Area, ft	0 000183	0 000079	0.000183	0 000148
$V_{m(std)}$	Standard Meter Volume, ft*	43.568	8 928	44 044	32 180
V _{m(std)}	Standard Meter Volume, m [~]	1 234	0 253	1 247	0.911
Q_{m}	Average Sampling Rate, dscfm	0.726	0,149	0.734	0.536
Ps	Stack Pressure, inches Hg	30.95	30 95	30 98	30 96
B_{ws}	Moisture, % by volume	5 1	43	47	47
B _{ws(sat)}	Moisture (at saturation), % by volume	10263.2	12047.5	12292.4	11534.4
V_{wstd}	Standard Water Vapor Volume, ft	2 358	0.400	2.184	1 647
1-B _{ws}	Dry Mole Fraction	0.949	0.957	0.953	0.953
M_d	Molecular Weight (d b.), lb/lb-mole	29 37	29 37	29 36	29.37
Ms	Molecular Weight (w.b.), lb/lb-mole	28.79	28.88	28.82	28.83
V_s	Stack Gas Velocity, ft/s	136.6	139.4	139 6	138 5
Α	Stack Area, ft ²	0.1	0.1	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	715	730	731	725
Q_s	Stack Gas Volumetric flow, dscfm	351	354	352	353
Q _s	Stack Gas Volumetric flow, dscmm	10	10	10	10
1	Isokinetic Sampling Ratio, %	98.8	46.7	99.5	81.7

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB US EPA Test Method 5 - Particulate Matter Generator - 50% Loading Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	50-5-1 9/9/2003 1155-1255	50-5-2 9/9/2003 1310-1410	50-5-3 9/9/2003 1424-1524	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	16 4	2 5 5	14.05	
PM	Beaker Weight Gain, mg	25.7	12.85	34.7	
PM	Total Catch, g	0.0421	0.0154	0.0488	0.035
CPM	Concentration, gr/dscf	1.49E-02	2.66E-02	1.71E-02	1.95E-4
CPM	Concentration, lb/dscf	2.13E-06	3.80E-06	2.44E-06	2.79E-0
E _{PM}	Emission Rate, lb/hr	4.49E-02	8.08E-02	5.16E-02	5.91E-6
	Condensible Matter				
PM	Organic Gain, mg	11 3	3.4	12.6	
PM	Aqueous Gain, mg	33.5	7.5	33.8	
PM	Total Catch, g	0.0448	0.0109	0.0464	0.0
C _{PM}	Concentration, gr/dscf	1.59E-02	1.88E-02	1.63E-02	1.70E-
CPM	Concentration, lb/dscf	2.27E-06	2.69E-06	2.32E-06	2.43E-
E _{PM}	Emission Rate, Ib/hr	4.77E-02	5.72E-02	4.91E-02	5.13E-
	Total Particulate Matter				
PM	Total Catch, g	8 69E-02	2.63E-02	9 52E-02	0.0
CPM	Concentration, gr/dscf	3.08E-02	4.55E-02	3.33E-02	0.0
	Concentration, lb/dscf	4.40E-06	6.49E-06	4.76E-06	0.0
CPM	,				

Summary of Stack Gas Parameters and Test Results Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 75% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	75-5-1 9/9/2003 1540-1640	75-5-2 9/9/2003 1652-1707	75-5-3 9/9/2003 1725-1825	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	5 00	4 50	4 50	4 67
У	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 69	30 69	30.69	30 69
V _m	Sample Volume, ft ³	44 648	7 694	43.054	31 799
Dp ^{1/2}	Average Square Root Dp. (in H ₂ O) ^{1/2}	1 5000	1 5684	1 5684	1.5456
DH	Avg Meter Orifice Pressure, in H ₂ O	1 70	1 18	1 60	1 49
T _m	Average Meter Temperature, °F	96	93	93	94
T _s	Average Stack Temperature, °F	620	750	750	707
V _{ic}	Condensate Collected, ml	63.4	11 2,	61.1	45.2
ÇO ₂	Carbon Dioxide content, % by volume	62	6.2	6.1	6.2
O ₂	Oxygen content, % by volume	128	12.8	12.9	12.8
N ₂	Nitrogen content, % by volume	81 0	81 0	81.0	81.0
_	Pitot Tube Coefficient	0 99	0 99	0 99	0 99
C _p	Circular Stack? 1=Y.0=N	1	1	1	0 99
As	Diameter or Dimensions, inches	4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	15	60	45
D_n	Nozzle Diameter, inches	0 183	0 183	0 183	0 183
	CALCULATED DATA				
A_n	Nozzle Area, ft⁴	0 000183	0 000183	0 000183	0 000183
V _{m(std)}	Standard Meter Volume, ft*	43 952	7 606	42 564	31.374
V _{m(std)}	Standard Meter Volume, m"	1 245	0 215	1.205	0.888
Q_{m}	Average Sampling Rate, dscfm	0 733	0 507	0.709	0 650
P_s	Stack Pressure, inches Hg	31.06	31.02	31.02	31.03
B_{ws}	Moisture, % by volume	6.4	65	63	64
$B_{ws(sat)}$	Moisture (at saturation), % by volume	12263.3	27767.1	27767.1	22599.2
V_{wstd}	Standard Water Vapor Volume, ft*	2 984	0 527	2 876	2 129
1-B _{ws}	Dry Mole Fraction	0.936	0.935	0.937	0.936
Μa	Molecular Weight (d b), lb/lb•mole	29.50	29 50	29 49	29 50
M_s	Molecular Weight (w.b.), lb/lb•mole	28.77	28 76	28.76	28.77
V _s	Stack Gas Velocity, ft/s	139 6	154.6	154 6	149 6
A	Stack Area, ft ²	0.1	0.1	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	731	809	809	783
Q,	Stack Gas Volumetric flow, dscfm	347	342	343	344
Q_{ϵ}	Stack Gas Volumetric flow, dscmm	10	10	10	10
<u>l</u>	Isokinetic Sampling Ratio, %	100.8	70.8	98.9	90.2

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 75% Loading Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	75-5-1 9/9/2003 1540-1640	75-5-2 9/9/2003 1652-1707	75-5-3 9/9/2003 1725-1825	Average
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	50 55	36	9.2	
PM	Beaker Weight Gain, mg	28.15	11.9	17.45	
PM	Total Catch, g	0.0787	0 0155	0.0267	0.0403
CPM	Concentration, gr/dscf	2.76E-02	3.15E-02	9.66E-03	2.29E-02
CPM	Concentration, lb/dscf	3.95E-06	4.49E-06	1.38E-06	3.27E-06
E _{PM}	Emission Rate, lb/hr	8.22E-02	9.23E-02	2.84E-02	6.76E-02
	Condensible Matter				
PM	Organic Gain, mg	19	27	17	
PM	Aqueous Gain, mg	39 .7	5.7	36.6	
PM	Total Catch, g	0.0416	0.0084	0 0536	0.03
CPM	Concentration, gr/dscf	1.46E-02	1.70E-02	1.94E-02	1.70E-02
CPM	Concentration, lb/dscf	2.09E-06	2.43E-06	2.78E-06	2.43E-06
E _{PM}	Emission Rate, lb/hr	4.35E-02	5.00E-02	5.71E-02	5.02E-02
	Total Particulate Matter				
ŘΜ	Total Catch, g	1 20E-01	2.39E-02	8 03E-02	0 07
CPM	Concentration, gr/dscf	4.22E-02	4.85E-02	2.91E-02	0.04
CPM	Concentration, lb/dscf	6.03E-0 6	6.93E-06	4.16E-06	0.00
	Emission Rate, lb/hr	1.26E-01	1.42E-01	8.55E-02	0.12

Summary of Stack Gas Parameters and Test Results Generator Testing

Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 100% Loading Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	100-5-1 9/10/2003 0758-0858	100-5-2 9/10/2003 0910-0925	100-5-3 9/10/2003 0945-1045	100-5-4 9/10/2003 1058-1158	Average
	MEASURED DATA			•		
P _{static}	Stack Static Pressure, inches H₂O	4 00	4.00	5 00	5 50	4 63
у	Meter Box Correction Factor	1 006	1.006	1.006	1.006	1 006
P _{bar}	Barometric Pressure, inches Hg	30 68	30 68	30 68	30 68	30 68
V_{m}	Sample Volume, ft ³	42 285	6 751	42 617	42 196	33 462
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1 5692	1 5716	1 5122	1 4697	1 5307
DH	Avg Meter Orifice Pressure, in H ₂ O	1 58	0 88	1 58	1 50	1 38
T_{m}	Average Meter Temperature, °F	69	74	83	90	79
Ts	Average Stack Temperature, °F	728	661	674	683	687
V_{lc}	Condensate Collected, ml	54 7	33	55.3	55.0	42.1
CO2	Carbon Dioxide content, % by volume	54	54	56	5.6	55
O_2	Oxygen content, % by volume	13.7	13 7	13 3	13.6	13 6
N_2	Nitrogen content, % by volume	80 9	80 9	811	808	80 9
C_p	Pitot Tube Coefficient	0 99	0 99	0 99	0 99	0 99
•	Circular Stack? 1=Y,0=N	1	1	1	1	
As	Diameter or Dimensions, inches	4 00	4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	15	60	60	49
D_n	Nozzle Diameter, inches	0 183	0 183	0 183	0.183	0.183
	CALCULATED DATA					
A_n	Nozzle Area, ft	0 000183	0 000183	0 000183	0 000183	0 000183
$V_{m(std)}$	Standard Meter Volume, ft*	43 692	6 898	42 892	41.927	33 852
$V_{m(std)}$	Standard Meter Volume, m [*]	1 237	0 195	1 215	1 187	0.959
Qm	Average Sampling Rate, dscfm	0.728	0.460	0 715	0 699	0 650
P _s	Stack Pressure, inches Hg	30.97	30.97	31.05	31.08	31 02
B_{ws}	Moisture, % by volume	5.6	22	5.7	5.8	48
$B_{ws(sat)}$	Moisture (at saturation), % by volume	24547.0	16255.9	17638.9	18651.0	19273.2
V_{wstd}	Standard Water Vapor Volume, ft	2 575	0 155	2 603	2.589	1 980
1-B _{ws}	Dry Mole Fraction	0.944	0.978	0.943	0.942	0.952
M_d	Molecular Weight (d b.), lb/lb•mole	29.41	29 41	29 43	29 44	29 42
$M_{\rm s}$	Molecular Weight (w.b.), lb/lb•mole	28.78	29 .16	28 77	28.77	28.87
V_{s}	Stack Gas Velocity, ft/s	153 3	148 2	144 2	140.6	146 6
A	Stack Area, ft ²	0.1	0.1	0.1	0.1	0.09
Q _a	Stack Gas Volumetric flow, acfm	803	776	755	736	767
Q_s	Stack Gas Volumetric flow, dscfm	349	370	344	333	349
Q_s	Stack Gas Volumetric flow, dscmm	10	10	10	9	10
1	Isokinetic Sampling Ratio, %	99.8	59.4	99.4	100.4	89.7

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB

US EPA Test Method 5 - Particulate Matter Generator - 100% Loading Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	100-5-1 9/10/2003 0758-0858	100-5-2 9/10/2003 0910-0925	100-5-3 9/10/2003 0945-1045	100-5-4 9/10/2003 1058-1158	Average
	EMISSIONS DATA					
	Particulate Matter					
PM	Filter Weight Gain, mg	2 75	4.65	3.65	3.35	
PM	Beaker Weight Gain, mg	8.85	5.5	9.2	8.8	
PM	Total Catch, g	0 0116	0.0102	0.0129	0.0122	0 0117
CPM	Concentration, gr/dscf	4.10E-03	2.27E-02	4.62E-03	4.47E-03	8.98E-03
CPM	Concentration, lb/dscf	5.85E-07	3.24E-06	6.60E-07	6.39E-07	1.28E-06
EPM	Emission Rate, lb/hr	1.22E-02	7.20E-02	1.36E-02	1.28E-02	2.77E-0
	Condensible Matter					
PM	Organic Gain, mg	13.2	17	6.3	10.3	
PM	Aqueous Gain, mg	24.3	2	49.1	35	
PM	Total Catch, g	0 0375	0.0037	0.0554	0.0453	0.03
CPM	Concentration, gr/dscf	1.32E-02	8.28E-03	1.99E-02	1.67E-02	1.50E-0
CPM	Concentration, lb/dscf	1.89E-06	1.18E-06	2.85E-06	2.38E-06	2.14E-0
E _{PM}	Emission Rate, lb/hr	3.96E-02	2.62E-02	5.87E-02	4.75E-02	4.42E-0
	Total Particulate Matter					
PM	Total Catch, g	4 91E-02	1 39E-02	6.83E-02	5 75E-02	0 05
CPM	Concentration, gr/dscf	1.73E-02	3.10E-02	2.46E-02	2.11E-02	0.03
CPM	Concentration, lb/dscf	2.48E-06	4.43E-06	3.51E-06	3.02E-06	0.00
E _{PM}	Emission Rate, lb/hr	5.18E-02	9.82E-02	7.24E-02	6.03E-02	0.08

PARTICULATE MF2 LIGHTING UNIT GENERATOR

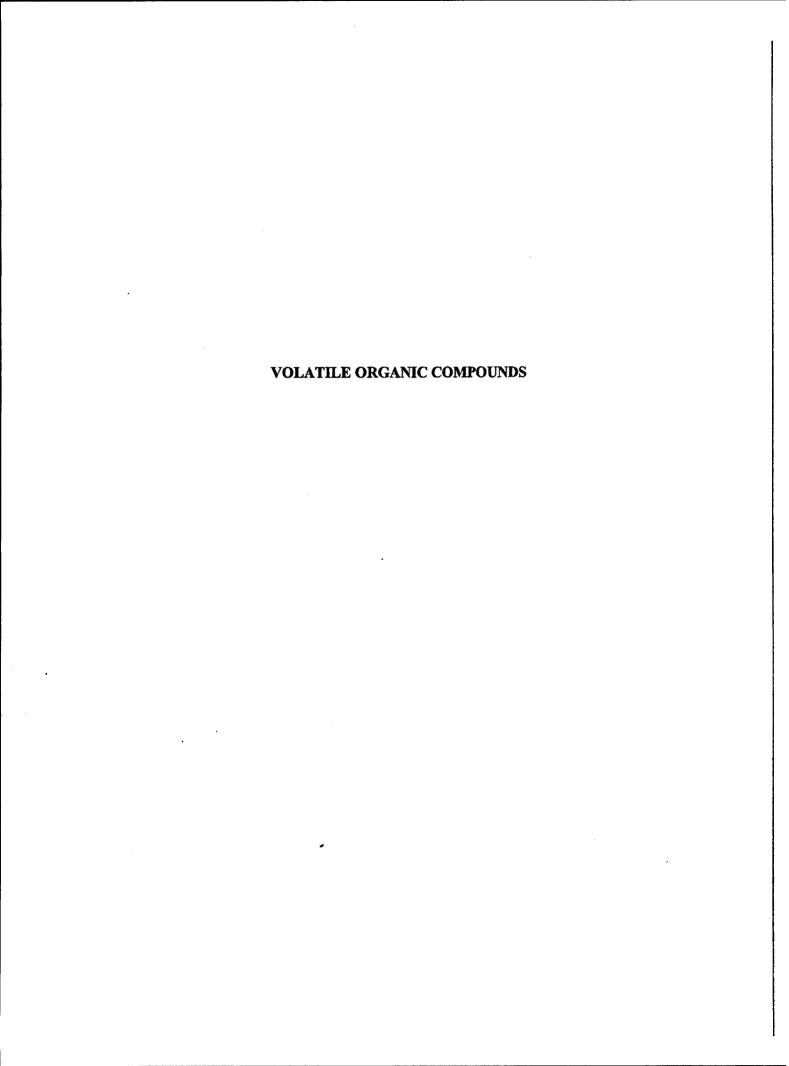
Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB US EPA Test Method 5 - Particulate Matter

US EPA Test Method 5 - Particulate Matter Light Generator Page 1 of 2

	RUN NUMBER RUN DATE RUN TIME	L-5-1 9/10/2003 1313-1413	L-5-2 9/10/2003 1429-1529	L-5-3 9/10/2003 1542-1642	Average
	MEASURED DATA				
P _{static}	Stack Static Pressure, inches H ₂ O	0.01	0 01	.0 01	0.01
у	Meter Box Correction Factor	1 006	1 006	1 006	1 006
P _{ber}	Barometric Pressure, inches Hg	30 68	30 69	30 69	30 69
$V_{\mathbf{m}}$	Sample Volume, ft ³	28 872	28 995	28 844	28 904
Dp1/2	Average Square Root Dp, (in H ₂ O) ^{1/2}	0 1039	0 1039	0 1039	0 1039
DH	Avg Meter Orifice Pressure, in H ₂ O	0 64	0.64	0 64	0 64
T _m	Average Meter Temperature, °F	91	94	95	93
T _s	Average Stack Temperature, °F	263	263	263	263
V _{ic}	Condensate Collected, ml	216	34 0	31 9	29.2
CO ₂	Carbon Dioxide content, % by volume	41	41	4.3	4.2
O ₂	Oxygen content, % by volume	14 9	15.1	153	15 1
N ₂	Nitrogen content, % by volume	81 0	80.8	80.4	80.7
C _p	Pitot Tube Coefficient	0 99	0 99	0 99	0 99
-p	Circular Stack? 1=Y.0=N	1	1	1	000
As	Diameter or Dimensions, inches:	4 00	4 00	4 00	4 00
Q	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0.495	0.495	0 495	0.495
	CALCULATED DATA				
A_n	Nozzle Area, ft	0 001336	0 001336	0 001336	0 001336
$V_{m(std)}$	Standard Meter Volume, ft	28 598	28 548	28 333	28 493
$V_{m(std)}$	Standard Meter Volume, m"	0 810	808 0	0 802	0.807
Q_{m}	Average Sampling Rate, dscfm	0.477	0.476	0.472	0.475
P _s	Stack Pressure, inches Hg	30.68	30,69	30.69	30 69
_B _{ws}	Moisture, % by volume	34	53	50	4.6
B _{ws(sat)}	Moisture (at saturation), % by volume	248.8	248.7	248.7	248.7
V _{wstd}	Standard Water Vapor Volume, ft	1 017	1 600	1 502	1 373
1-B _{ws}	Dry Mole Fraction	0.966	0.947	0.950	0.954
M _d	Molecular Weight (d b), lb/lb-mole	29.25	29 26	29 30	29 27
M _s V _s	Molecular Weight (w.b), lb/lb•mole Stack Gas Velocity, ft/s	28.87 7.9	28.66 8.0	28.73 8.0	28.75 8 0
	Stack Area. ft ²	0.1			
Q_{a}	Stack Area, it Stack Gas Volumetric flow, acfm	0.1 42	0.1 4 2	0.1 42	0.09 42
Q _s	Stack Gas Volumetric flow, dscfm	30	30	30	30
Q,	Stack Gas Volumetric flow, dscmm	1	1	1	1
1	Isokinetic Sampling Ratio, %	103.5	105.0	104.0	104.2

Summary of Stack Gas Parameters and Test Results Generator Testing Scott AFB US EPA Test Method 5 - Particulate Matter Light Generator Page 2 of 2

	RUN NUMBER RUN DATE RUN TIME	L-5-1 9/10/2003 1313-1413	L-5-2 9/10/2003 1429-1529	L-5-3 9/10/2003 1542-1642	Average
	EMISSIONS DATA	-			
	Particulate Matter				
PM	Filter Weight Gain, mg	7.55	7 75	6 6 5	
PM	Beaker Weight Gain, mg	5.4	4.45	4.35	
PM	Total Catch, g	0.0130	0.0122	0.0110	0.0121
CPM	Concentration, gr/dscf	6.99E-03	6.59E-03	5.99E-03	6.52E-0
CPM	Concentration, lb/dscf	9.98E-07	9.42E-07	8.56E-07	9.32E-0
E _{PM}	Emission Rate, lb/hr	1.80E-03	1.67E-03	1.52E-03	1.67E-0
	Condensible Matter				
PM	Organic Gain, mg	35	2 1	4	
PM	Aqueous Gain, mg	22.2	18.3	24.6	
PM	Total Catch, g	0.0257	0 0204	0.0286	0.02
C _{PM}	Concentration, gr/dscf	1.39E-02	1.10E-02	1.56E-02	1.35E-0
CPM	Concentration, lb/dscf	1.98E-06	1.58E-06	2.23E-06	1.93E-0
E _{PM}	Emission Rate, lb/hr	3.57E-03	2.80E-03	3.96E-03	3.44E-0
	Total Particulate Matter				
PM	Total Catch, g	2.22E+01	1.83E+01	2.46E+01	21 71
C _{PM}	Concentration, gr/dscf	2.09E-02	1.76E-02	2.16E-02	0.02
CPM	Concentration, lb/dscf	2.98E-06	2.52E-06	3.08E-06	0.00
EPM	Emission Rate, lb/hr	5.38E-03	4.47E-03	5.48E-03	5.11E-0



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	030174.0000.002		
	<u>0030-1 (-86)</u>	<u>0030-2 (MF2)</u>	<u>Average</u>
Acetone			
Molecular Weight, g/g-mole	58 08	58.08	
Target Catch, µg	0.84	0.42	0.63
Concentration, mg/dscm a	8 31E-02	4.18E-02	0.06
Concentration, ppbvd b	3.44E+01	1 73E+01	25 86
Emission Rate, lb/hr c	1.07E-04	5 38E-05	0 00
Emission Rate, lb/1000 lb fuel	2.12E-02	2.69E-02	0 02
Benzene			
Molecular Weight, g/g-mole	78 11	78 11	
Target Catch, µg	1 52	3.40	2 46
Concentration, mg/dscm *	1 51E-01	3.38E-01	0.24
Concentration, ppbvd ^b	4 66E+01	1.04E+02	75.35
Emission Rate, lb/hr c	1.95E-04	4.36E-04	0.00
Emission Rate, lb/1000 lb fuel	3.87E-02	2.18E-01	0.13
Bromodichloromethane			
Molecular Weight, g/g-mole	163 83	163 83	
Target Catch, µg	0.01	0.01	0.01
Concentration, mg/dscm *	9 94E-04	9.94E-04	0.00
Concentration, ppbvd ^b	1 46E-01	1 46E-01	0.15
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0.00
Emission Rate, lb/1000 lb fuel	2 54E-04	6.40E-04	0 00
Bromoform			
Molecular Weight, g/g-mole	252 73	252.73	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm a	9 94E-04	9 94E-04	0 00
Concentration, ppbvd b	9.46E-02	9 46E-02	0.09
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0 00
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

Scott AFB Generator Testing Page 2 of 10

	030174.0006.002		
	0030-1 (-86)	0030-2 (MF2)	<u>Average</u>
Bromomethane			
Molecular Weight, g/g-mole	94.94	94.94	
Target Catch, µg	0 13	0.01	0.07
Concentration, mg/dscm *	1 29E-02	1 09E-03	0.01
Concentration, ppbvd ^b	3 27E+00	2 77E-01	1 78
Emission Rate, lb/hr c	1.67E-05	1 41E-06	0 00
Emission Rate, lb/1000 lb fuel	3 30E-03	7 04E-04	0 00
2-Butanone			
Molecular Weight, g/g-mole	72 11	72.11	
Target Catch, µg	0 19	0.46	0.33
Concentration, mg/dscm a	1 89E-02	4 57E-02	0 03
Concentration, ppbvd ^b	6.30E+00	1 53E+01	10 78
Emission Rate, lb/hr c	2.43E-05	5 89E-05	0 00
Emission Rate, lb/1000 lb fuel	4 83E-03	2.95E-02	0 02
1,3 Butadiene			
Molecular Weight, g/g-mole	54 09	54 09	
Target Catch, µg	0.05	0.05	0 05
Concentration, mg/dscm *	4.97E-03	4 97E-03	0.00
Concentration, ppbvd b	2 21E+00	2 21E+00	2 21
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0.00
Emission Rate, lb/1000 lb fuel	1 27E-03	3 20E-03	0 .00
Carbon disulfide			
Molecular Weight, g/g-mole	76.13	76.13	
Target Catch, µg	0 01	0.01	0 01
Concentration, mg/dscm *	9 94E-04	9 94E-04	0.00
Concentration, ppbvd ^b	3 14E-01	3 14E-01	0.31
Emission Rate, lb/hr c	1 28E-06	1.28E-06	0 00
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00

 $^{^{\}text{a}}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

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030174.0006.002						
	0030-1 (-86)	0030-2 (MF2)	<u>Average</u>			
Carbon tetrachloride						
Molecular Weight, g/g-mole	153.84	153 84				
Target Catch, μg	0 01	0 01	0.01			
Concentration, mg/dscm a	9 94E-04	9 94E-04	0 00			
Concentration, ppbvd b	1 55E-01	1 55E-01	0.16			
Emission Rate, lb/hr c	1 28E-06	1 28E-06	0 00			
Emission Rate, lb/1000 lb fuel	2 54E-04	6.40E-04	0 00			
Chlorobenzene						
Molecular Weight, g/g-mole	112.56	112.56				
Target Catch, µg	0.01	0 01	0.01			
Concentration, mg/dscm *	1 39E-03	1 39E-03	0.00			
Concentration, ppbvd b	2 97E-01	2 97E-01	0 30			
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00			
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00			
Chlorodibromomethane						
Molecular Weight, g/g-mole	208.28	208 28				
Target Catch, µg	0 01	0 01	0.01			
Concentration, mg/dscm a	1 39E-03	1.39E-03	0.00			
Concentration, ppbvd ^b	1 61E-01	1 61E-01	0.16			
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00			
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00			
Chloroethane						
Molecular Weight, g/g-mole	65 51	65 51				
Target Catch, µg	0.01	0.01	0.01			
Concentration, mg/dscm *	1 39E-03	1 39E-03	0 00			
Concentration, ppbvd b	5 11E-01	5 11E-01	0.51			
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00			
Emission Rate, Ib/1000 lb fuel	3.56E-04	8 96E-04	0.00			
Chloroform						
Molecular Weight, g/g-mole	119.39	1.19 39				
Target Catch, μg	0 01	0.01	0.01			
Concentration, mg/dscm a	1 39E-03	1 39E-03	0.00			
Concentration, ppbvd b	2 80E-01	2 80E-01	0.28			
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00			
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00			

 $^{^{\}text{a}}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm,

b Parts per billion by volume.

c Pounds per hour

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	030174.0006.002		
	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
Chloromethane			
Molecular Weight, g/g-mole	50 49	50 49	
Target Catch, µg	0.01	0 01	0.01
Concentration, mg/dscm ^a	9 94E-04	9 94E-04	0 00
Concentration, ppbvd b	4.74E-01	4.74E-01	0.47
Emission Rate, lb/hr e	1 28E-06	1 28E-06	0.00
Emission Rate, lb/1000 lb fuel	2 54E-04	6.40E-04	0 00
1,1-Dichloroethane			
Molecular Weight, g/g-mole	98 96	98 96	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm a	1 39E-03	1.39E-03	0 00
Concentration, ppbvd b	3 38E-01	3 38E-01	0 34
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
1,2-Dichloroethane			
Molecular Weight, g/g-mole	98.96	98 96	
Target Catch, µg	0.01	0 01	0 01
Concentration, mg/dscm *	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 38E-01	3 38E-01	0.34
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
1,1-Dichloroethene			
Molecular Weight, g/g-mole	96.94	96 94	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 45E-01	3.45E-01	0 35
Emission Rate, lb/hr c	1 79E-06	1.79E-06	0 00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume

c Pounds per hour

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030174.0000.002				
	0030-1 (-86)	0030-2 (MF2)	Average	
cis-1,2-Dichloroethene				
Molecular Weight, g/g-mole	96.94	96.94		
Target Catch, μg	0.01	0.01	0 01	
Concentration, mg/dscm a	1 39E-03	1 39E-03	0 00	
Concentration, ppbvd b	3 45E-01	3 45E-01	0 35	
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00	
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00	
trans-1,2-Dichloroethene				
Molecular Weight, g/g-mole	96 94	9 6.94		
Target Catch, µg	0.01	0.01	0 01	
Concentration, mg/dscm *	1.39E-03	1 39E-03	0.00	
Concentration, ppbvd b	3 45E-01	3 45E-01	0.35	
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00	
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00	
1,2-Dichloropropane				
Molecular Weight, g/g-mole	112.99	112 99		
Target Catch, µg	0 01	0.01	0.01	
Concentration, mg/dscm a	1 39E-03	1 39 E-03	0.00	
Concentration, ppbvd ^b	2 96E-01	2 96E-01	0 30	
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00	
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00	

Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour

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	030174.0006.002		
	0030-1 (-86)	0030-2 (MF2)	Average
cis-1,3-Dichloropropene			
Molecular Weight, g/g-mole	110.97	110 97	
Target Catch, μg	0.01	0.01	0 01
Concentration, mg/dscm *	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 02E-01	3 02E-01	0 30
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0 00
trans-1,3-Dichloropropene			
Molecular Weight, g/g-mole	110 97	110 97	
Target Catch, µg	0 01	0 01	0 01
Concentration, mg/dscm ^a	1 39E-03	1 39E-03	0 00
Concentration, ppbvd b	3 02E-01	3.02E-01	0.30
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00
Ethylbenzene			
Molecular Weight, g/g-mole	106 17	106 17	
Target Catch, µg	0.44	0.52	0.48
Concentration, mg/dscm a	4 37E-02	5.17E-02	0 05
Concentration, ppbvd b	9 91E+00	1 17E+01	10 81
Emission Rate, lb/hr c	5 64E-05	6.66E-05	0 00
Emission Rate, lb/1000 lb fuel	1.12E-02	3 33E-02	0.02
2-Hexanone			
Molecular Weight, g/g-mole	100.16	100 16	
Target Catch, µg	0.05	0.05	0.05
Concentration, mg/dscm *	4 97E-03	4 97E-03	0 00
Concentration, ppbvd ⁶	1 19E+00	1 19E+00	1 19
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0.00
Emission Rate, lb/1000 lb fuel	1.27E-03	3.20E-03	0.00

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

Scott AFB Generator Testing Page 7 of 10

	030174.0000.002			
	<u>9030-1 (-86)</u>	0030-2 (MF2)	Average	
Methylene chloride				
Molecular Weight, g/g-mole	84 93	84 93		
Target Catch, µg	0.40	0 55	0.48	
Concentration, mg/dscm a	4 02E-02	5 47E-02	0.05	
Concentration, ppbvd b	1 14E+01	1.55E+01	13 43	
Emission Rate, lb/hr c	5 18E-05	7.05E-05	0 00	
Emission Rate, lb/1000 lb fuel	1 03E-02	3.52E-02	0 02	
l-Methyl-2-pentanone				
Molecular Weight, g/g-mole	100 16	100.16		
Target Catch, μg	0.05	0 05	0 05	
Concentration, mg/dscm a	4 97E-03	4 97E-03	0 00	
Concentration, ppbvd b	1 19E+00	1 19E+00	1 19	
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0 00	
Emission Rate, lb/1000 lb fuel	1 27E-03	3.20E-03	0 00	
Styrene				
Molecular Weight, g/g-mole	104 15	104 15		
Target Catch, µg	0 01	001	0 01	
Concentration, mg/dscm *	9 94E-04	9 94E-04	0.00	
Concentration, ppbvd b	2 30E-01	2 30E-01	0.23	
Emission Rate, lb/hr c	1 28E-06	1.28E-06	0 00	
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00	

^a Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour

Scott AFB Generator Testing Page 8 of 10

	030174.0000.002		
	0030-1 (-86)	<u>0030-2 (MF2)</u>	<u>Average</u>
1,1,2,2-Tetrachloroethane	•		
Molecular Weight, g/g-mole	167.85	167 85	
Target Catch, µg	0.01	0 01	0 01
Concentration, mg/dscm ^a	1 39E-03	1 39E-03	0 00
Concentration, ppbvd ^b	1 99E-01	1 99E-01	0 20
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8 96E-04	0 00
Fetrachloroethene			
Molecular Weight, g/g-mole	165.83	165 83	
Target Catch, µg	0.01	0.01	0 01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0.00
Concentration, ppbvd b	2 02E-01	2 02E-01	0.20
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, lb/1000 lb fuel	3.56E-04	8.96E-04	0.00
Foluene			
Molecular Weight, g/g-mole	94.14	94 14	
Target Catch, µg	0.74	1 40	1.07
Concentration, mg/dscm a	7 36E-02	1 39E-01	0 11
Concentration, ppbvd ^b	1 88E+01	3.56E+01	27 18
Emission Rate, lb/hr °	9 48E-05	1 79E-04	0 00
Emission Rate, lb/1000 lb fuel	1.88E-02	8.96E-02	0.05

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

c Pounds per hour

Scott AFB Generator Testing Page 9 of 10

· · · · · · · · · · · · · · · · · · ·	130 174.0000.002		
	<u>0030-1 (-86)</u>	0030-2 (MF2)	<u>Average</u>
1,1,1-Trichloroethane			
Molecular Weight, g/g-mole	133.40	133 40	
Target Catch, µg	0.01	0 01	0 01
Concentration, mg/dscm *	1 39E-03	1 39E-03	0.00
Concentration, ppbvd b	2 51E-01	2 51E-01	0 25
Emission Rate, lb/hr c	1 79E-06	1.79E-06	0 00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
1,1,2-Trichloroethane			
Molecular Weight, g/g-mole	133 40	133 40	
Target Catch, µg	0 01	0.01	0.01
Concentration, mg/dscm a	1 39E-03	1 39E-03	0.00
Concentration, ppbvd b	2 51E-01	2 51E-01	0.25
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0.00
Emission Rate, lb/1000 lb fuel	3 56E-04	8.96E-04	0.00
Trichloroethene			
Molecular Weight, g/g-mole	131.39	131.39	
Target Catch, µg	0.01	0.01	0.01
Concentration, mg/dscm *	1.39E-03	1 39E-03	0 00
Concentration, ppbvd b	2 55E-01	2 55E-01	0.25
Emission Rate, lb/hr c	1 79E-06	1 79E-06	0 00
Emission Rate, 1b/1000 lb fuel	3 56E-04	8.96E-04	0.00
Trichlorofluoromethane (Freon 11)			
Molecular Weight, g/g-mole	137 37	137 37	
Target Catch, μg	0.01	0.01	0.01
Concentration, mg/dscm a	9 94E-04	9 94E-04	0.00
Concentration, ppbvd b	1 74E-01	1 74E-01	0 17
Emission Rate, Ib/hr c	1 28E-06	1 28E-06	0.00
Emission Rate, lb/1000 lb fuel	2.54E-04	6.40E-04	0.00

 $^{^{\}text{n}}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm

b Parts per billion by volume.

e Pounds per hour

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	<u>0030-1 (-86)</u>	0030-2 (MF2)	Average
o-Xylene			
Molecular Weight, g/g-mole	106.17	106.17	
Target Catch, μg	0 35	0.57	0 46
Concentration, mg/dscm ²	1 07E-03	1 07E-03	0 00
Concentration, ppbvd b	7 88E+00	1.28E+01	10 36
Emission Rate, lb/hr ^c	4.48E-05	7 30E-05	0.00
Emission Rate, lb/1000 lb fuel	8.90E-03	3 65E-02	0.02
m-Xylene & p-Xylene			
Molecular Weight, g/g-mole	106 17	106.17	
Target Catch, µg	0 84	1 20	1.02
Concentration, mg/dscm a	8 33E-02	1.19E-01	0.10
Concentration, ppbvd b	1 89E+01	2.70E+01	22 95
Emission Rate, lb/hr c	1 07E-04	1 54E-04	0 00
Emission Rate, lb/1000 lb fuel	2.13E-02	7 68E-02	0.05
Vinyl acetate			
Molecular Weight, g/g-mole	86.09	86.09	
Target Catch, µg	0 05	0 05	0.05
Concentration, mg/dscm a	4.97E-03	4 97E-03	0.00
Concentration, ppbvd b	1 39E+00	1 39E+00	1 39
Emission Rate, lb/hr c	6.41E-06	6.41E-06	0 00
Emission Rate, lb/1000 lb fuel	1.27E-03	3.20E-03	0.00

 $^{^{\}rm a}$ Milligrams per dry standard cubic meter at 68° F (20° C) and 1 atm.

b Parts per billion by volume.

e Pounds per hour

	·	
	·	
	POLYNUCLEAR AROMATIC HYDROCARBONS	
	•	
•		

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
	MEASURED DATA			
P _{static} . y	Stack Static Pressure, inches H ₂ O Meter Box Correction Factor	5.22 / 1.273 /	0.01 1.273	2.62 1.273
P _{bar}	Barometric Pressure, inches Hg	30.65	30.68	30.67
V _m	Sample Volume, L ³	11.780	16.150	13.965
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1.4267 /	0.1039	0.7653
T _m	Average Meter Temperature, °F	78 🗸	101	90
Τ _ε	Average Stack Temperature, °F	548 ✓	263	406
CO2	Carbon Dioxide content, % by volume	50/	42	4.6
O ₂	Oxygen content, % by volume	147 🗸	15 .1	14 9
N ₂	Nitrogen content, % by volume	80 3	80.7	80 5
C _p	Pitot Tube Coefficient	0 99 🗸	0.99	0 99
As F Q	Circular Stack? 1=Y,0=N: Diameter or Dimensions, inches ⁻ Fuel Flow, lb/hr Sample Run Duration, minutes	1 4.00 5.04 50	1 4.00 2.00 60	4.00 55
	CALCULATED DATA			
$V_{m(std)}$	Standard Meter Volume,L ³	15.072	19 858	17.465
$V_{m(std)}$	Standard Meter Volume,ft ³	0.532	0.701	0.617
P _s	Stack Pressure, inches Hg	31.03	30.68	30.86
B _{ws}	Moisture, % by volume	5.1	5.4	5.2
1-B _{ws}	Dry Mole Fraction	0.949	0.946	0.948
M _d	Molecular Weight (d b), lb/lb•mole	29.39	29,27	29.33
M₅ V₅	Molecular Weight (w b), lb/lb•mole Stack Gas Velocity, ft/s	28.81	28.66	28.74
	<u> </u>	128 2	8.0	68.1
A Q _a	Stack Area, ft ² Stack Gas Volumetric flow, acfm	0.1 672	0.1 42	0.09
Q _s	Stack Gas Volumetric flow, dscfm	344	30	187
Q_s	Stack Gas Volumetric flow, dscmm	10	1	5

10/21/63

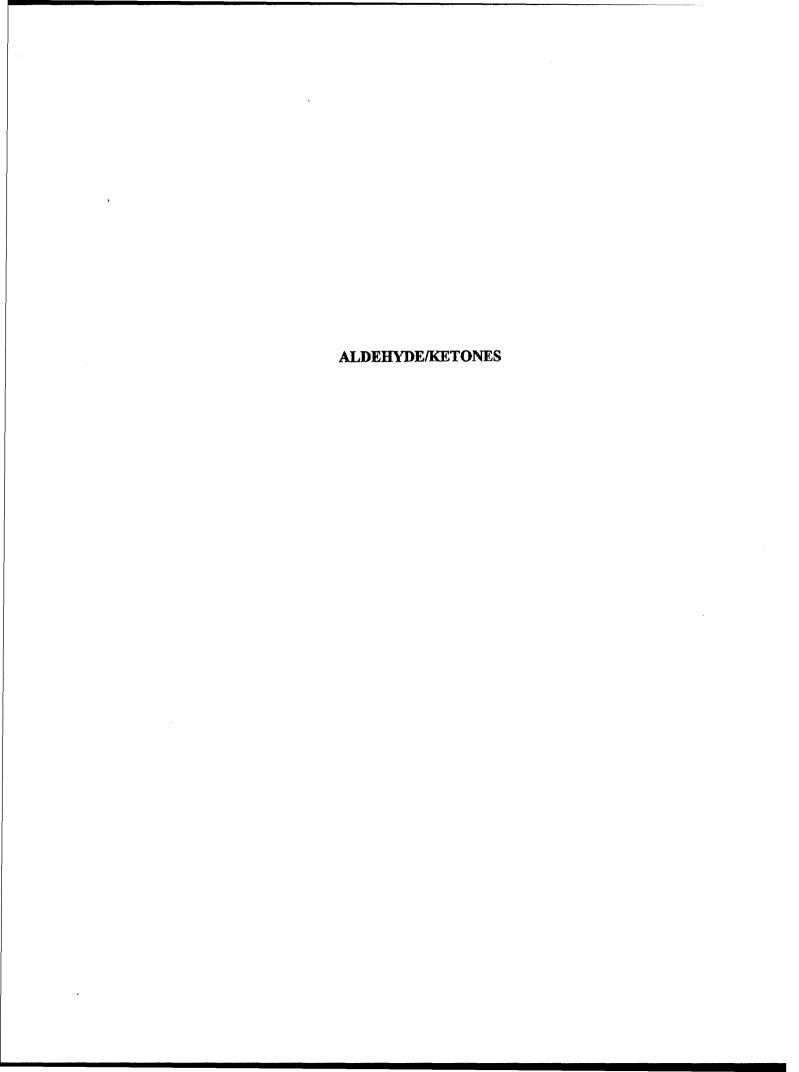
	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
· · · · · · · · · · · · · · · · · · ·	EMISSIONS DATA	<u> </u>		
	Naphthalene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	128.2	128.2	128.2
	Concentration, lb/dscf	8.27E-09	6.28 E- 09	
ppmdv	Parts Per Million, Wet Basis	2.48E-02		2.19E-02
	Parts Per Million, Dry Basis	2.62E-02		2.31E-02
	Emission Rate, lb/hr	1.80E-04 V		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	2-Methylnaphthalene			
	Analysis, u g/sample	2.0	2.0	
	Molecular Weight, MW	142.2	142.2	
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	2.24E-02		1.97E-02
	Parts Per Million, Dry Basis	2.36E-02		2.08E-02
	Emission Rate, lb/hr	1.80E-04 V		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	2-Chloronaphthalene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	162.6	162.6	162.6
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Wet Basis Parts Per Million, Dry Basis	1.96E-02 2.06E-02		1.72E-02 1.82E-02
	Emission Rate, lb/hr	2.00E-02 1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02		2.08E-02
	Acenaphthene			
	Analysis, u g/sample	20	2.0	2.0
	Molecular Weight, MW	154.2	154.2	154.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	2.07E-02	1.57E-02	1.82E-02
	Parts Per Million, Dry Basis	2.18E-02	1.66E-02	1.92E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	<i>5 97E-0</i> 3	2.08E-02
	Acenaphthylene			İ
	Analysis, ug/sample	20	20	2.0
	Molecular Weight, MW	152.2	152.2	152.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Wet Basis	2.09E-02	1.59E-02	
	Parts Per Million, Dry Basis	2.20E-02	1.68E-02	
	Emission Rate, lb/hr	1.80E-04	1.19E-05	
	Emission Rate, lb/1000 lb fuel	3 56E-02	5.97E-03	2.08E-02

	RUN NUMBER	PAH-1 (-86)	PAH-2 (MF2)	
	RUN DATE	09/08/03 - 09/10/03	9/10/2003	Average
	RUN TIME	Composite	1325 - 1425	
	Fluorene			
	Analysis, ug/sample	2.0	20	2.0
	Molecular Weight, MW	166.2	166.2	166.2
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.92E-02	1.45E-02	1.69E-02
	Parts Per Million, Dry Basis	2.02E-02	1.54E-02	1.78E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3 56E-02	5.97E-03	2.08E-02
	Phenanthrene			
	Analysis, ug/sample	20	2.0	2.0
	Molecular Weight, MW	178.0	178.0	178.0
	Concentration, lb/dscf	8.27E-09	6.28 <i>E-0</i> 9	0.0
	Parts Per Million, Dry Basis	1.79E-02		1.57E-02
	Parts Per Million, Dry Basis	1.89 E- 02	1.44E-02	1.66E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3 56E-02	5 97E-03	2.08E-02
	Anthracene			
	Analysis, <i>u</i> g/sample	20	20	2.0
	Molecular Weight, MW	178.2	178.2	178.2
	Concentration, lb/dscf	8.27 <i>E-</i> 09	6.28 E- 09	0.0
· ·	Parts Per Million, Dry Basis	1.79E-02		1.57E-02
	Parts Per Million, Dry Basis	1.88E-02		1.66E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3 56E-02	5 97E-03	2.08E-02
	Fluoranthene			
	Analysis, ug/sample	20	20	2.0
	Molecular Weight, MW	202.3	202.3	202.3
	Concentration, lb/dscf	8.27 E- 09	6.28 <i>E</i> -09	0.0
	Parts Per Million, Dry Basis	1.57E-02		1.38E-02
	Parts Per Million, Dry Basis	1.66E-02		1.46E-02
	Emission Rate, lb/hr Emission Rate, lb/1000 lb fuel	1.80E-04 3 56E-02		9.59E-05 2.08E-02
	·		5.5.2	
	Pyrene			
	Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	202.3	202.3	202.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
	Parts Per Million, Dry Basis	1.57E-02		1.38E-02
	Parts Per Million, Dry Basis	1.66E-02		1.46E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5 97E-03	Z.U8E-02

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Average
	Chrysene			
	Analysis, ug/sample	2.0	2.0	
	Molecular Weight, MW	228.3	228.3	228.3
	Concentration, lb/dscf	8.27E-09	6.28 E -09	
ppmdv	Parts Per Million, Dry Basis	1.40E-02	1.06E-02	1.23E-02
	Parts Per Million, Dry Basis	1.47E-02	1.12E-02	1.29E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3 56E-02	5.97 E-0 3	2.08E-02
	Benzo(a)anthracene			
	Analysis, ug/sample	2.0	20	2.0
	Molecular Weight, MW	228.3	228.3	228.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.40E-02	1.06E-02	1.23E-02
	Parts Per Million, Dry Basis	1.47E-02	1.12E-02	1.29E-02
	Emission Rate, lb/hr	1.80 <i>E-04</i>	1.19E-05	9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Benzo(b)fluoranthene			
	Analysis, ug/sample	2.0	20	2.0
	Molecular Weight, MW	252.3	252.3	252.3
	Concentration, lb/dscf	<i>8.27E-0</i> 9	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.26E-02		1.11E-02
	Parts Per Million, Dry Basis	1.33E-02		1.17E-02
	Emission Rate, lb/hr	1.80E-04		9.59E-05
	Emission Rate, lb/1000 lb fuel	3.56E-02	5 97E-03	2.08E-02
	Benzo(k)fluoranthene			
	Analysis, ug/sample	20	2.0	2.0
	Molecular Weight, MW	252.3	252.3	252.3
	Concentration, lb/dscf	8.27E-09	6.28E-09	0.0
ppmdv	Parts Per Million, Dry Basis	1.26E-02	9.58 E- 03	
	Parts Per Million, Dry Basis	1.33E-02		1.17E-02
	Emission Rate, lb/hr	1.80E-04	1.19E-05	
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-02
	Benzo(a)pyrene Analysis, ug/sample	2.0	2.0	2.0
	Molecular Weight, MW	2.0 252.3	2.0 252.3	252.3
	Concentration, lb/dscf	8.27 E-09	6.28 E-0 9	0.0
ppmdv	Parts Per Million, Dry Basis	1.26E-02	9.58E-03	- 1
ppiila	Parts Per Million, Dry Basis	1.33E-02	1.01E-02	
	Emission Rate, lb/hr	1.80E-04	1.19E-05	
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	
	Emission Nate, in 1990 in 1961	J.JUL-UZ	J.81L-03	2.002-02

	RUN NUMBER RUN DATE RUN TIME	PAH-1 (-86) 09/08/03 - 09/10/03 Composite	PAH-2 (MF2) 9/10/2003 1325 - 1425	Averag
	Indeno(1,2,3-c,d)pyrene			
	Analysis, ug/sample	20	20	2.
	Molecular Weight, MW	276.3	276.3	276.
	Concentration, lb/dscf	8.27E-09	6.28 E- 09	0.
ppmdv	Parts Per Million, Dry Basis	1.15E-02	8.75E-03	1.01E-0
	Parts Per Million, Dry Basis	1.21E-02	9.25E-03	1.07E-0
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3.56E-02	5 97E-03	2.08E-0
	Dibenz(a,h)anthracene			
	Analysis, ug/sample	20	2.0	2
	Molecular Weight, MW	278.4	278.4	278
	Concentration, lb/dscf	8.27E-09	6.28E-09	0
ppmdv	Parts Per Million, Dry Basis	1.14E-02	8.68 E- 03	1.01E-0
	Parts Per Million, Dry Basis	1.21E-02	9.18 E- 03	1.06E-0
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-0
	Benzo(g,h,i,perylene)		•	
	Analysis, ug/sample	2.0	2.0	2.
	Molecular Weight, MW	276.3	276.3	276
	Concentration, lb/dscf	8.27E-09	6.28 E- 09	0.
ppmdv	Parts Per Million, Dry Basis	1.15E-02	8.75E-03	1.01E-0
	Parts Per Million, Dry Basis	1.21E-02	9.25E-03	1.07E-0
	Emission Rate, lb/hr	1.80E-04	1.19E-05	9.59E-0
	Emission Rate, lb/1000 lb fuel	3.56E-02	5.97E-03	2.08E-0

Run 5515-1 and 5515-2 had a Rpt. Limit of 2 0; if ND result is shown in italics



Summary of Stack Gas Parameters and Test Results 030174.006.0002

Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

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	RUN NUMBER RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 9/10/2003 1325 - 1425	Average
	MEASURED DATA			
P _{static}	Stack Static Pressure, inches H₂O	5 22 ✓	0.01 🗸	2 62
у	Meter Box Correction Factor	1 003 🏑	1.003	
P_{bar}	Barometric Pressure, inches Hg	30.65 ✓	30.68	30 67
V _m	Sample Volume, ft ³	34.396	29.420 🗸	31 908
Dp ^{1/2}	Average Square Root Dp, (in H ₂ O) ^{1/2}	1.4267	0 1039	0 7653
DH	Avg Meter Orifice Pressure, in H ₂ O	1 85	0 63	1 24
T _m	Average Meter Temperature, °F	77	99	88
Ts	Average Stack Temperature, °F	548	263	406
V _{Ic}	Condensate Collected, ml	46.7	34 5	406
CO ₂	Carbon Dioxide content, % by volume	5.0	42	4.6
O ₂	Oxygen content, % by volume	147	15 1	14 9
N ₂	Nitrogen content, % by volume	80.3	80 7	80 5
C _p	Pitot Tube Coefficient	0.99	0 99	0 99
O _p	Circular Stack? 1=Y,0=N	1	1	0 00
As	Diameter or Dimensions, inches	4.00	4.00	4 00
F	Fuel Flow, lb/hr	5.04	2.00	
Q	Sample Run Duration, minutes	50	60	55
D_n	Nozzle Diameter, inches	0.193	0 500	0.347
	CALCULATED DATA			
A_n	Nozzie Area, ft ⁴	0 000203	0 001363	0.000783
$V_{m(std)}$	Standard Meter Volume, ft*	34.909	28 627	31.768
$V_{m(std)}$	Standard Meter Volume, m	0 989	0 811	0.900
\mathbf{Q}_{m}	Average Sampling Rate, dscfm	0 698	0.477	0.588
P _s	Stack Pressure, inches Hg	31.03	30.68	30.86
B_{ws}	Moisture, % by volume	59	5.4	56
B _{ws(sat)}	Moisture (at saturation), % by volume Standard Water Vapor Volume, ft	7086.4	248.8	3667.6
V _{wstd} 1-B _{ws}	•	2.198	1 624	1.911
M _d	Dry Mole Fraction Molecular Weight (d b), lb/lb•mole	0.941 29 39	0.946 29 27	0.944 29.33
M _s	Molecular Weight (w.b.), lb/lb•mole	28.71	28.67	28.69
V _s	Stack Gas Velocity, ft/s	128.4	8.0	68.2
Å	Stack Area, ft ²	0.1	0.1	0.09
Q_a	Stack Gas Volumetric flow, acfm	672	42	357
Q_{s}	Stack Gas Volumetric flow, dscfm	344	30 🗸	187
\mathbf{Q}_{s}	Stack Gas Volumetric flow, dscmm	10	1	5
1	Isokinetic Sampling Ratio, %	87.3	103.3	95.3

Summary of Stack Gas Parameters and Test Results 030174.006.0002 Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

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	RUN NUMBER RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 09/10/03 1325 - 1425	Average
	EMISSIONS DATA			
нсно	<u>Formaldehyde</u>			
	Target Catch, µg	800	3800	2300.0
1	Concentration, µg/dscm	809.31	4687.75	2748 53
J	Emission Rate, lb/hr	1 04E-03	5 18E-04	7 79E-04
	Emission Rate, lb/1000 lb fuel	2 06E-01	2.59E-01	2 33E-01
СН₃СНО	<u>Acetaldehyde</u>			
]	Target Catch, µg	750	1200	975.0
I	Concentration, µg/dscm	758.72	1480.34	1119.53
<u> </u>	Emission Rate, lb/hr	9.74E-04	1 64E-04	5 69E-04
	Emission Rate, lb/1000 lb fuel	1 93E-01	8 18E-02	1 37E-01
СН₂СНСНО	Acrolein			
<u> </u>	Target Catch, µg	26	560	293 00
	Concentration, µg/dscm	26.30	690.83	358.56
	Emission Rate, lb/hr	3.38E-05	7 64E-05	5.51E-05
Ī	Emission Rate, lb/1000 lb fuel	6.70E-03	3.82E-02	2 24E-02
	Propanal			
	Target Catch, µg	26	240	133.0
[Concentration, µg/dscm	26 3	296.1	161.2
1	Emission Rate, lb/hr	3 38E-05	3.27E-05	3 33E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	1 64E-02	1. 15E-0 2
сн₃снснсно	Crotonaldehyde			
]	Target Catch, µg	90	260	175.00
	Concentration, µg/dscm	91.05	320.74	205 89
	Emission Rate, lb/hr	1.17E-04	3 55E-05	7.62E-05
	Emission Rate, lb/1000 lb fuel	2 32E-02	1.77E-02	2.05E-02
CH3COC5H11	Methyl Ethyl Ketone/Butyraldehydes	**		4,5.
	Target Catch, µg	26	260	143.0
	Concentration, µg/dscm	26.3 2.385.05	320.7 3.55E.05	173.5
	Emission Rate, lb/hr Emission Rate, lb/1000 lb fuel	3 38E-05 6.70E-03	3 55E-05 1.77E-02	3 46E-05 1 22E-02
	Emilesion Nato, IU/ 1000 ID IUCI	U.1VE-U3	1.776-02	1 226-02
C ₆ H₅CHO	Benzaldehyde			Ī
	Target Catch, µg	26	220	123 0
	Concentration, µg/dscm	26 3	271.4	148.8
	Emission Rate, lb/hr	3.38E-05	3 00E-05	3 19E-05
i	Emission Rate, lb/1000 lb fuel	6.70E-03	1.50E-02	1 08E-02
CH₃)₂CHCH₂CH	(Isopentanal			
	Target Catch, µg	26	110	68.0
	Concentration, µg/dscm	26 3	135.7	81.0
	Emission Rate, lb/hr	3 38E-05	1 50E-05	2.44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7.50E-03	7 10E-03

Summary of Stack Gas Parameters and Test Results 030174.006.0002 Scott AFB Generator Testing Aldehyde/Ketones - Test Method 0011

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	RUN NUMBER RUN DATE RUN TIME	0011-1 (-86) 09/08/03 - 09/10/03 Composite	0011-2 (MF2) 09/10/03 1325 - 1425	Average
	EMISSIONS DATA - Continued			
CH₃(CH₂)₃CHO	<u>Pentanal</u>			
	Target Catch, µg	26	110	68.0
	Concentration, µg/dscm	26 3	135.7	81 0
	Emission Rate, lb/hr	3 38E-05	1.50E-05	2.44E-05
	Emission Rate, lb/1000 lb fuel	6 70E-03	7 50E-03	7.10E-03
C ₆ H₄CH₃CHO	o-Tolualdehyde			
	Target Catch, µg	26	110	68.0
	Concentration, µg/dscm	26 3	135.7	81 0
	Emission Rate, lb/hr	3.38E-05	1.50E-05	2.44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7 50E-03	7.10E-03
	m,p-Tolualdehyde			
	Target Catch, µg	26	110	68.000
	Concentration, µg/dscm	26.3	135.7	81.000
	Emission Rate, lb/hr	3.38 <u>E</u> -05	1 50E-05	2 44E-05
	Emission Rate, lb/1000 lb fuel	6.70E-03	7.50E-03	7.10E-03
CH₃(CH₂)₄CHO	<u>Hexanal</u>			
	Target Catch, ug	26	110	68
	Concentration, µg/dscm	26.3	135.7	81.0
	Emission Rate, lb/hr	3.38E-05	1 50E-05	
•	Emission Rate, lb/1000 lb fuel	6.70E-03	7.50E-03	7.10E-03

Run 0011-1 had a Rpt. Limit of 26.0; if ND result is shown in italics. Formaldehyde was present in trip blank; Crotonaldehyde may be biased due to matrix interfer Run 0011-2 had a Rpt. Limit of 110; if ND result is shown in italics. Formaldehyde was present in trip blank; Benzaldehyde may be biased due to matrix interfere